



Edward Bell
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REFLECTIONS
FOR
EVERY DAY IN THE YEAR,
ON
THE WORKS OF GOD,
AND OF
HIS PROVIDENCE THROUGHOUT
ALL NATURE.

From the GERMAN of
MR. C. C. STURM.

The Seventh Edition.

VOLUME II.



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MAY I.

THE SYSTEM OF THE WORLD.

THE sun, of all parts of the system of the world, is that which interests us the most. Its form is spherical, and it is composed of a fiery substance which never consumes. There are spots in certain parts of it (as may be seen through telescopes), which shew that it moves round its own axis. This body is one hundred millions of miles distant from us. It is a million of times larger than our earth, the circumference of which is more than 24,000 miles; it communicates its light to nineteen opaque globes, which take their course round it at different distances, and are called planets. The nearest to it is Mercury, which is in a manner buried in the rays of the sun; and this being so close to it, is the reason, that, of all the planets, we know the least of it. A little further is Venus, which is called the Morning Star, poetically Lucifer, when she rises before the sun, and the Evening Star, poetically Hesperus, when she sets after the sun. Next to Venus comes our globe, the surface of which is composed of land and water, mountains and valleys; and the interior part consists of

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beds and strata of different substances. This earth is the abode of a multitude of creatures, both animate and inanimate, metals, plants, and animals. The moon turns in a particular orbit round us, and accompanies our globe in the whole circle it describes round the sun. It is fifty times smaller than the earth; and there are visibly distinguished in it some parts that are light and shining, and others that are dark and dull: The first supposed to be continents, and the other seas. For, if the moon was composed only of one substance; if it was a body entirely solid, or entirely fluid, it would reflect the rays of the sun all the same way, and we should not see those spots in it. A fluid body, such as water, absorbs a great quantity of rays, and only reflects a part of them: It is therefore very apparent, that the dark parts of the moon are seas, and that the bright parts are land. Among the light parts, some are more brilliant than others, and even cast a shade. They must then be higher than others, and resemble our mountains. Some of these mountains are alone, others are contiguous, and sometimes form very long chains. In the seas of the moon, some parts are observed to be less dark, and appear, consequently, to be like our islands. The four last planets of our solar system are, Mars; Jupiter, with his four moons, or satellites; Saturn, with five; and the Georgium Sidus, with two already discovered, and probably more. There are spots also visible to us in them. Georgium Sidus is so far from the sun, that he requires no less than 82 years to finish his revolution. This vast domain of the sun, which, without reckoning comets, extends to more than 400 millions of miles, is however but a part of the universe. For each of the fixed stars, the number of which is perhaps more than the grains of sand

on the sea shore, may be considered as a sun, which equals ours, or perhaps surpasses it.

Such is the wonderful greatness of the works of God, and thus the heavens declare the glory of the Lord! With what splendour does the majesty of the Creator shine in those wonderful works, which invite us so strongly to pay a tribute of admiration and praise to the great Being who made them! Is there any thing in nature more proper to inspire us with sublime ideas of the Deity, than the sight of the celestial sky! Can we ever raise our eyes to heaven, without having the most lively sense of the magnificence and greatness of him who gave being to all things, and who governs them with incomprehensible power, wisdom, and goodness! What are poor miserable mortals, lost in the immensity of the creation, who crawl like insects on a grain of sand! What are we, in comparison of those innumerable solar systems, which contain so many vast globes within their circle! What are we, especially in comparison of the Creator of all these worlds, these suns, and these skies, which, if we attempt to measure, trouble and confound the understanding! And yet this sovereign Ruler of the immense universe deigns to honour us with his protection and paternal care. How adorable are all his mercies!

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MAY II.

REFLECTIONS ON THE BLOSSOMS OF TREES.

AT this instant, in which our gardens and fields are adorned with all the ornaments of spring, all Europe appears with equal pomp, and every where presents the most cheerful prospect. The power of the first word pronounced by the Creator, when

he formed the world, produced all these magnificent effects. One hand alone, the hand of the Creator and Monarch of the world, has in a few days renewed, and in a manner created the earth again, for the use and pleasure of his intelligent creatures. Come, O man! come and try what thy wisdom and power can do. Art thou able to make a single tree blossom, to call from the earth the smallest blade of grass, to order a single tulip to appear in all its beauty? Draw near, learned artists, skilful painters, and contemplate these flowers, examine these master-pieces with the most scrupulous attention; is any thing wanting to their perfection? Do you find any fault in the mixing of the colours, in their form or proportion? Could your pencil express the dazzling red of the peach blossom? Could you imitate the fine enamel, the uniformity and simplicity with which a cherry-tree in blossom is adorned? But why do I say, imitate? Are you even capable of feeling all the magnificence of renewed nature, or of forming to yourself a just idea of its inimitable art? If there were no stronger proofs on earth of the power and wisdom of God, the flowers of spring alone would be sufficient to convince us of it. Each tree that blossoms, each herb and flower proclaims his goodness and wisdom, which is over all the earth. We remark an infinite variety in the blossoms of trees. All are beautiful; but their beauties are different. One surpasses another; but there are none which has not something pleasing peculiar to itself. However great the Creator in the dispensing his gifts, he still reserves to himself the liberty of bestowing more on some than others. But this difference is only in respect to accessory qualities. Such a tree, for example, has blossoms of a dazzling white; another has red stripes and shades,

shades, which the first wants: some have, added to the beauty of their form and colour, an exquisite perfume. But all these differences are only accidental, and do not in the least affect their fertility. Thus, when God does not give us the same advantages as appear in some of our fellow-creatures, it ought not to afflict or disturb us: for the loss of any accidental beauty, of whatever nature it may be, does not hurt our real welfare in the least. If we are not as rich, as highly considered, or of as fine a form as others, we may, notwithstanding, be quite as happy, as virtuous, and as agreeable, both to God and man. Provided we bear the fruits of piety and virtue, we possess real beauty. For why do the blossoms of trees please us more than the rich colours of a tulip, an auricula, or a ranunculus? It is because the pleasure the latter gives us is of short duration, whereas the others give us hope of delicious fruit. Let us not, therefore, confine our wishes to the beauty and exterior charms of a fine flower. The beauty, the graces, the bloom of health, and other outward advantages of nature, are not the things which afford us durable and permanent pleasures. The blossoms which promise fruit agreeable to God, these are what truly merit our esteem. They will never fade. All those dazzling beauties we admire in the blossoms on the trees, will disappear in a few days; and such will be the fate of all the blooming young people now so vain of their charms. Let this thought ever attend us in the solitary walks we take in our gardens: And let our chief study be, to act in such a manner, that, when the beauty and charms of the body are no more, we may supply their place with abundant fruits of virtue and piety.

MAY III.

CONTINUAL REVOLUTIONS AND CHANGES IN
THE EARTH.

MOTION and change seem absolutely necessary for the preservation of the corporeal world. In the whole universe, there is not the smallest particle in a constant and entire state of rest.—Nothing is more easy than to be convinced of this, by attending to what passes on the globe we inhabit. The earth turns, every 24 hours, round its own axis, and by this motion, all the points of its surface (except the poles) change place with more or less rapidity. Under the line, where this motion is the swiftest, every thing moves more than two leagues in a minute, though it does not change its situation on the surface. But, besides this, the earth makes its annual revolution round the sun with so much velocity, that, according to the most moderate calculations, it goes 146 leagues in a minute, though its course is not perceptible. The motion of earthly bodies is more observable. Little rivulets unite, and form greater. These, in their turn, form torrents and rivers, which are afterwards lost in the sea. This is not all: Plants and animals every where require water to nourish them. The water rises in vapours, which form into clouds, and fall again in rain, snow, and fogs, and whatever is not transformed in its fall goes again into the sea, where the flux and reflux, storms, torrents, &c. keep the water in a perpetual motion. Neither is there any repose in our atmosphere. Between the tropics, an east wind continually blows; and, though, in other places, the motion is not always perceptible, yet the barometers and thermometers
prove

prove that the air is never perfectly still. Meteors also, of every sort, shew that nature is in constant action. The coat or surface of the earth is also subject to frequent revolutions. The hardest rocks split; stones gradually wear and break; lands fall in, others are overflowed; certain grounds rise, and others are overturned by earthquakes; little hills are washed away by waters; valleys are filled up; marshes grow dry, and are covered with trees; the bottom of the sea becomes firm ground, &c. Light and darkness, cold and heat, drought and wet, succeed each other by turns. Lastly, the continual variation of heat occasions, every hour, changes which are often imperceptible. If we add to this the changes visible in animals, we may have some idea of the continual revolutions to which every thing here is subject. It is said, that man daily loses about two ounces and an half in perspiration. It is replaced by other particles; so, that at the end of ten years, a man's body is entirely changed. All animals and plants feed, grow, propagate, die, and corrupt.

Thus, every thing on earth is in motion; every thing grows and decays by turns. In a word, to be born, and to die, is what continually passes on the theatre of the world. But this does not happen accidentally, or without order or design. Every thing acts according to certain laws, which tend to certain ends. Every thing combines, every thing concurs, in the most perfect manner, to the glory of the Creator. All contribute to, all end in the happiness of the universe. These continual revolutions are useful warnings to us. They teach us that this world cannot be our place of destination. When we consider the continual vicissitudes, which all here below must undergo, is

it not the most affecting lesson for us, on the vanity of all earthly things, on the uncertainty and shortness of life, on the necessity of a better state, an everlasting life in the world to come? Yes, every thing points out to us our destination, and declares we are but sojourners and travellers on the earth.

With what consolation my soul is penetrated, when, in the midst of the revolutions of the world, I lift up my eyes towards thee, O Lord! towards thee, who art both immutable and eternal! Let the mountains be shaken, and fall down; let the sea be troubled, and the waves roar; let all that is earthly be destroyed, and return to dust; still thou art, and ever must be invariably the same.

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MAY IV.

AN INVITATION TO SEEK GOD IN THE WORKS OF NATURE.

AWAKE, O my soul, awake from the slumber in which thou hast been so long plunged, and be attentive to all around thee. Consider thyself and all other creatures. Reflect on their origin, their construction, their form, their use, and a thousand other circumstances, which must fill every attentive observer of the works of God with admiration. When thou seest the sky, with its variety of lively colours, the stars which shine so bright, the light which discovers to thee the objects around; ask thyself, from whence proceeds all this? Who formed that immense expanse of the heavens? Who placed in the sky those
innumerable

innumerable fires, those stars, which, though at so prodigious a distance, dart their rays even unto us? Who ordered the stars to move with so much regularity, and the sun to give light and heat to the earth? Is it not thee, adorable Creator? Yes, it is thy mighty word, that called forth all things, and ordained them to exist and live. What must be thy greatness, thy incomprehensible greatness, O Lord God! to enable thee to make all these out of nothing! How infinite thy goodness to have so planned every thing, that all contribute to our happiness! Stupendous mountains! What mighty hand fixed your foundations? Who raised your heads to the very clouds? Who adorned you with forests, with fruit trees, with plants, and flowers? Who covered your tops with snow and ice? Who caused to flow out of your bowels those springs and rivers, which water and enrich the ground? It is thy hand, O almighty Creator! which has done all these wonders: and I adore that divine hand, with sentiments of admiration, respect, and gratitude. Flowers of the field! who gave you your magnificent clothing? How happens it that you were produced out of a little earth and a few drops of water? From whence have you that variety of perfumes, which embalm the air and delight us, those lively colours which charm our sight, and which no human art can imitate? This is thy work, O Lord! Every thing on earth proceeds from thee. And you, O ye animated beings, who people the air, the waters, and the land, to whom do you owe your existence, your construction, and those instincts, so various and so wonderful, which astonish our reason, and are so well adapted to your nature and way of life? What a multitude of wonders

may I not observe in myself? How does a handful of dust become a body well organized? How is it that one of its parts has sight; that another, by means of the undulation of air, is informed of the thoughts of other people? How is it that I have the faculty of communicating ideas and desires? How does a little matter bruised by my teeth, afford me so many agreeable sensations? I acknowledge the hand of my Creator in all these incomprehensible wonders. His wisdom, power, and goodness, all combine to render us happy.



MAY V.

THE DAWN OF DAY.

THE morning dawn discovers to the world a new and magnificent creation. The shades of night deprive us of the sight and enjoyment of the earth and sky. But when the light of day returns, we behold all nature renewed and embellished. On a sudden, we see the earth arrayed in all its magnificence ; the mountains crowned with forests ; the hillocks clothed with vines ; the fields covered with their harvests ; and the meadows watered with rivulets. The horizon glows ; the clouds are all tinged with variety of the liveliest colours ; cheerful flowery vales are discovered at a distance ; light vapours arise and change to gold ; and the dew drops that fall on the flowers, take the mild lustre of pearls. By degrees, as the light increases, the spectacle becomes more magnificent. We go from light to light, till at last nature presents us with her most glorious object. The sun rises ; and the first ray that

that escapes over the mountain which had concealed it from us, darts rapidly from one end of the horizon to the other. More rays follow, and strengthen the first. By degrees the disk of the sun comes out, and shews itself entire ; then advances and runs its course, with a majesty which the human eye can no longer support. Were any one suddenly to see this delightful scene, for the first time, from the top of a hill, what would he think ? what would he do ? Doubtless, he would prostrate himself, full of sweet emotion and pious respect, to adore that God who is the Author of the sun. Eternal Being ! (would he cry) in the beauties of the rising day I acknowledge thy power and wisdom. With the lark, who, towering in the air, salutes the morn, and proclaims its arrival by the sweetness of its notes, I soar towards thee, O Lord ! who art the Father of the whole creation. The joy and gladness of all nature, the animation of every being, invites me also to raise my soul towards thee with the most lively transports of gratitude and joy. At this moment, while the sun is darting his first rays upon the earth, millions of creatures praise and adore thee. Can I then be still insensible to all these wonders ! From thee proceeds each beauty of the morning dawn ; from thee, who art the source of light. It is thou who hast given it those lively colours, and impressed a sense of them on our souls. Thou hast given us souls of a heavenly nature, capable of tracing thee in all thy works. Our eyes seem to behold thee in the splendour of the rising sun. If thou didst not exist, there would be neither sun, nor dawn, nor creation.

But are not these indolent men much to be pitied, who never gave themselves the heavenly

pleasure of contemplating the rising sun? O if they were but rational enough to indulge in the pure and delightful enjoyment which this magnificent object of nature is so calculated to inspire! If they could but feel, that the sight of beautiful nature must naturally fill the heart with pious delight, and profound veneration for the Creator! If they could, in fine, comprehend, that one single thought, which rises in the soul, on seeing the dawn of day, may become the happy beginning of a Christian life, would it not be worth giving up some hours of sleep for it!

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MAY VI.

WONDERS OF VISION.

NO objects can become visible to us, unless rays of light proceed from them, and fall upon our eyes. Those rays which enter into our eye, pass through the cornea, through the watery humour, through the pupil, and penetrate at last even into the chrystalline. After having been sufficiently refracted and collected together in this place, they paint on the retina (behind the vitreous humour) the image of the outward objects, and they draw it with a perfect exactness and clearness. The rays then touch the optic nerve, which is as sensible as the finest string of a harpsicord. This nerve, by its motions and vibrations, produces different sensations in the soul, and excites perceptions and ideas in it, conformable to the impressions which the outward objects make upon the brain. What has just been said of the sight, shews that it well deserves some reflection
upon

upon it. The image of all our outward objects, is painted on the retina upside down, and yet we see them right, and in their real situation. How is it, that the largest objects are painted in our eyes extremely small, and yet we see every thing according to its real size? How is it, that when we see from a high tower some thousands of houses below us in a great city, that each of them is painted so exactly in our eyes, on a space which is scarce three times as large as the head of a pin? So many millions of rays come through a very little opening, and collect together on the retina which lines the inside of the eye, without confounding with one another, and still preserving the same order which the points of the object from whence they proceeded, had amongst themselves. But this is not all. Look from the top of a high mast at a fleet in full sail; contemplate the sea itself, how many millions of waves will you see? Each of them, however, reflects a mass of rays upon our eyes, small as they are. Afterwards, on a calm day, go on a high mountain, and look over a country of five or six leagues extent: Each tree, each herb, or even blade of grass, sends rays to us, otherwise it would be impossible we should see a continued verdure on the fields beneath us. Is it not also very astonishing that we do not see double; and, though we have two eyes, that each object appears single? Another cause of admiration is, that those objects which we see are not alone visible to us. We are surprised at the number of rays they send to so small a space as the pupil of an eye, yet they convey as much to spaces of that size every where. It is for that purpose, that wherever we go, new rays supply the place of the preceding, and render visible to us the same objects we perceived before we changed

changed place. But all the rays that are admitted into the eye do not take effect. Along with these there are numberless others, which, being much weaker, are effaced by the light of the first, but are always ready to do the same offices when required. If we prick a sheet of paper with a pin, and look through the hole (so much less than our eye), we still, however, see the objects, though they appear much smaller to us. But who reflects upon all this? The habit of seeing, as soon as we open our eyes, makes us consider this operation as a thing extremely simple and easy to comprehend. We are, however, far from being able to explain the manner in which we see objects. Indeed, we know how the image forms itself in the bottom of the eye. We also know what all the parts which compose it, contribute to it. But that is not sufficient: For the eye can have no idea of what passes in it. It is therefore necessary, that the impression which the rays make upon it should reach to the brain; and that, in order to do so, the rays should paint the image on a coat woven with nerves, which correspond with those of the brain. Thus the motion impressed by the rays on the nerves of the retina, is transmitted by the optic nerve to the brain. But we cannot describe what passes there; because we do not know, either the nature of the brain, or the use of its several parts. These wonders, which are beyond our conception, are evidently the work of a Divine Power, united with infinite goodness, as they are all so many blessings bestowed upon us.

MAY VII.

SPRING RENEWS THE FACE OF THE EARTH.

WHAT a change is there throughout all nature, and how great is the goodness of that supreme Being, who causes the seasons to succeed each other so regularly ! Our earth, which rested during winter, resumes its ornaments, and its fertility. The whole creation is animated, revived, and full of joy and gladness. A very few months ago, the whole surface of the earth was barren and desert. The valleys, the prospect of which gives us now such pleasure, were buried in a deep snow. The mountains, whose grey tops rise to the very clouds, were covered with snow and ice, enveloped in impenetrable fogs. In those verdant walks, which the nightingale now inhabits, nothing was seen but dry leafless branches. The rivers and streams, which murmur as they flow, were stopped in their course by the ice, which froze them. The birds, which now fill the air with their songs, were insensible, in caves and marshes, or gone to other countries. There reigned a mournful silence every where ; and, as far as our sight could reach, we saw only a dismal solitude. But scarce has the almighty breath been felt, when nature awakes from its inanimate state, and spreads pleasure and a thousand charms around us. The sun approaches our globe ; and, at once, the atmosphere is penetrated with a quickening warmth ; the whole vegetable kingdom proves its beneficent effect ; and the earth produces grass and flowers of every sort. Now the face of the earth is renewed and embellished. At the sight

sight of this happy revolution can we fail of looking up to the great Being, who is the cause of all?

“ Lord, thou visitest the earth, and makest the
“ valleys to smile. Thou sprinklest them with
“ dew to enrich them, and the springs with
“ which thou waterest them, are always plenti-
“ ful. At thy command, our harvests are ripe,
“ and fill our hearts with joy. Thy blessing is
“ upon our furrows, and the rain refreshes the
“ dry earth. Thou makest it soft, and blessest
“ the seed. Thou crownest the year with thy
“ blessings. Thy word maketh the ground fruit-
“ ful. Under thy steps the flowers and fruit
“ spring up. Blessing and fruitfulness are thine.
“ The pastures of the desert are watered, and
“ the little hills are adorned with a beautiful
“ verdure. The countries are covered with
“ flocks, and the valleys are full of corn. Every
“ place resounds with songs of joy and gladness.
“ The praises and thanksgivings of all nature
“ rise to heaven itself.”

In this revolution, which the spring brings with it, I behold an emblem of the salutary change which a soul experiences, who has not resisted the operations of the divine grace. It had, before, no real beauty; its faculties were depraved and inordinate; It was unable to produce pious fruits. But, how happy its state, since it has felt the divine influence of grace. It is now like the earth in spring, which feels the power of the sun. Ignorance vanishes; folly and vice disappear; the passions are subdued; the heart is full of virtuous and religious sentiments, the fruits of which delight and edify mankind.

MAY

MAY VIII.

THE SPRINGING UP OF SEEDS.

THERE are at present many changes making before our eyes in the vegetable kingdom, but there are still many more which escape our sight, and which nature does in secret. The seed, some time ago sowed in the ground, swells, increases, and the plant by degrees shoots up and grows. This mechanism deserves so much the more attention, as it is, properly speaking, the source of all the beauties which spring and summer present us with in the vegetable kingdom. The seed is composed of different parts, according to the different species; but the chief is the germ. Each shoot has two parts; the one simple, which becomes the root; the other scaly, which rises and becomes the stalk and head of the plant. The seed of most plants is composed of two pieces, which are called lobes, that are filled with a mealy substance, which serves for seminal leaves to the plant. Mosses have the most simple seed of any. It consists only in the shoot, without pellicles or lobes. A certain degree of moisture and warmth are absolutely necessary to make the seeds spring up. The increase of heat, and the difference observable in the taste and smell, seem to discover here a sort of fermentation. By means of this preparation, the mealy substance of the lobes becomes proper to nourish the tender shoot. It is known by experiments, which have been tried with coloured juices, that this substance sucks in a moisture, which furnishes a proper nourishment, with the assistance of air, and of heat, till the plant has acquired consistence

ence enough to profit by the juices which the root procures for it. Then the exhausted lobes dry by degrees, and, at the end of a few weeks, fall off, when the plant no longer requires them. Certain herbs, which grow on mountains, are of a very particular nature. As their duration is short, it would often happen that the seed would not have time to ripen. In order, therefore, that the species should not perish, the bud, which contains the shoot, is formed at the top of the plant, puts out leaves, falls, and takes root. But, when the plant comes out of the earth, it would run too great a risk, if it was at once exposed to the outward air and the power of the sun. Its parts, therefore, remain folded, and laid one upon another, nearly as it was in the seed. But, by degrees, as the root strengthens, and stretches on all sides, it furnishes the upper vessels with abundance of juice, by means of which, all the organs soon unfold themselves. The plant is, at first, almost gelatinous, but it gradually acquires more consistence, and is always increasing.

This abridgement of the history of the shooting of plants, is sufficient to shew us, how many preparations and means nature makes use of, to produce one single little plant. When, therefore, we see a seed spring up, which we have sowed, we must not imagine (as is usually the case) that it is not worth our attention. It is one of those wonders of nature, which is a subject of reflection for the greatest men. At the sight of this phenomenon, let us silently admire the power and wisdom of that God, who is adorable in all things. The order with which the plants so regularly succeed each other, is a proof of that wisdom which manifests itself even in the smallest things. This reminds us of our moral nature:

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That also contains a certain seed, which shoots with years, which grows and bears fruit. In the designs of the Creator, this was a means to lead us to happiness ; but our natural corruption, and outward circumstances, often defeat those merciful intentions.

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MAY IX.

THE CHICK IN THE EGG.

WE are much obliged to the naturalists, for taking the trouble to make inquiries into the generation and propagation of animals. Nothing contributes more to the glory of the Creator than the observations made on the wisdom which appears in the production of animated beings. The less we are able to give an account of all his works, the more earnest we should be to take every opportunity of knowing some of them at least. With this view, let us now consider the formation of the chick in the egg ; such as has been discovered by one of the greatest naturalists. The hen has scarce sat on the egg twelve hours, when they begin already to discover in it some lineaments of the head and body of the chicken which is to be born. The heart appears to beat at the end of the day : It has at that time the form of a horse shoe, but no blood is yet seen. At the end of 48 hours two vesicles of blood can be distinguished, the pulsation of which is very visible. One is the left ventricle, the other the root of the great artery. At the fiftieth hour one auricle of the heart appears, and resembles a lace or noose folded down upon itself. The beating

beating of the heart is first observed in the auricle, and afterwards in the ventricle. At the end of seventy hours they distinguish wings, and on the head two bubbles for the brain; one for the bill, and two others for the fore part and hind part of the head. Towards the end of the fourth day, the two auricles, already visible, draw nearer to the heart than they did before. The auricle which appears first, seems to have two horns, but it is afterwards found to be two auricles. The liver appears towards the fifth day. At the end of 131 hours, the first voluntary motion is observed. At the end of 138 hours, the lungs and stomach become visible, and at the end of 142, the intestines, the loins, and the upper jaw. At the 144th hour, two ventricles are seen, and two drops of blood, instead of the single drop which was seen before. The seventh day, the brain, which was slimy, begins to have some consistence. At the 190th hour of incubation, the bill opens, and the flesh appears in the breast. At the 194th, the sternum is seen, that is to say, the breast-bone. At the 210th the ribs come out of the back, the bill is very visible, as well as the gall-bladder. The bill becomes green at the end of 236 hours; and if the chick is taken out of its coverings, it evidently moves itself. The feathers begin to shoot out towards the 240th hour, and the skull becomes gristly. At the 264th, the eyes appear. At the 288th the ribs are perfect. At the 331st, the spleen draws near the stomach, and the lungs to the chest. At the end of 355 hours, the bill frequently opens and shuts; and at the end of 451 hours, or the 18th day, the first cry of the chick, is already heard. It afterwards gets more strength, and grows continually, till at last it sets itself at liberty, by opening the prison in which it

it was shut up. Adorable wisdom of God ! it is by so many different degrees, that these creatures are brought into life. All these progressions are made by rule ; and there is not one of them without sufficient reason. If, for example, the liver is always formed towards the end of the fifth day, it is founded on the preceding situation of the chick, and on the changes that were to follow. No part of its body could appear sooner or later, without the whole embryo suffering, and each of its limbs becomes visible at the most proper moment. This ordination, so wise, and so invariable, in the production of this animal, is manifestly the work of a supreme Being : But we shall still more sensibly acknowledge the creative powers of the Lord, if we consider altogether, the manner in which the chick is formed out of the parts which compose the egg. How wonderful is it, that there should be in this egg, the principle of life of an animated being ; that all the parts of an animal's body should be concealed in it, and require nothing but heat to unfold and quicken them ! That the whole formation of the chick should be so constantly and regularly the same way ! That, exactly at the same time, the same changes take place in twenty eggs, or more, that a hen hatches ! That when the position of an egg is changed, and turned from one side to the other, it does not in the least hurt the foetus, or prevent its formation ! That the chick, when it is hatched, is heavier than the egg was before ! Even these are not all the wonders in the formation of the chick. The microscope, and the observing spirit of man, have only discovered what falls the most under our senses. How many things, the complete discovery of which is reserved for them who come after us, of which we shall not have a perfect knowledge

knowledge till in a future state ! How many inquiries may be made on this mystery of generation, inquiries which the human mind can never here resolve. But let not this ignorance discourage us ; let us only think of making a good use of the knowledge we have, by leading us to admire and praise the wisdom, the power, and the goodness of our Creator.

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MAY X.

ON THE BUDS OF FLOWERS.

ON all sides I discover a multitude of flowers in the bud. They are at present enveloped and closely shut up in their intrenchments. All their beauties are hidden, and their charms are veiled. Such is the wretched miser who lives by himself, who centers all in himself, and whose views are mean and selfish ; who connects every thing within himself ; who makes his own private advantage or pleasure the only object of his desires, and the narrow motive of his actions. But soon the penetrating rays of the sun will open the buds of the flowers, and will deliver them from their silken bonds, that they may blow magnificently in our sight. What delightful perfumes will they exhale ! Thus, also, may the most sordid miser become beneficent when his soul is enlightened by grace. To a heart of stone may succeed a feeling and compassionate one ; a heart susceptible of the sweetest and tenderest emotions. By the mild influence of the Sun of righteousness, the social affections discover themselves, and open more and more. Sensibility no longer centers in one object ;
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it becomes universal ; it takes in all mankind ; it extends its generous cares, and all that is within its reach is benefited by it. When I reflect on the buds and blossoms, I think of you, O lovely youth of both sexes ! The beauty and power of your minds are not yet unfolded. Your faculties are still in a great measure concealed. The hope which your parents and masters conceive of you will not so soon be realised. When you consider these buds, say to yourselves, I resemble that bud, my parents and masters expect from me the unfolding of my talents and faculties ; they do every thing for me ; they neglect nothing for my information and instruction ; they watch most tenderly over my education ; to the end that I may become (first by blossoms and afterwards by excellent fruit) their joy and comfort, and make myself useful to society. I will therefore do all in my power to fulfil the pleasing hopes they form. I will take advantage of all the improvement and instruction they give me, in order to become every day wiser, better, and more amiable. For this purpose, I will take care not to give way to the desires and passions of youth, which might be fatal to my innocence, and destroy all the hopes conceived of me.

“ In the morn of life, I blossom like the bud,
“ which insensibly opens. My heart beats with
“ joy, yields to the most cheerful hopes, and sees
“ nothing but happiness in future. But if I was
“ imprudent enough to give a loose to mad de-
“ sires, and the false pleasures of luxury, those
“ guilty flames would soon wither and corrupt my
“ young heart.”

MAY XI.

INDEFATIGABLE LABOURS OF THE BEE.

IT is one of the advantages of Spring, that it furnishes us with an opportunity of observing the industry and labours of the bee.—Certainly a beehive is one of the finest sights a lover of nature can ever have. We cannot tire contemplating that laboratory, where millions of artificers are employed in different works. We are in a continual state of surprise on seeing their order and regularity; and particularly in those magazines so plentifully furnished with all that is necessary for the subsistence of the society in winter. What merits our attention more than all the rest, is, the indefatigable application and uninterrupted labours of this little republic. The bees give us an example of industry and activity, which is not only uncommon, but perhaps has not its equal. They appear as soon as winter is over, even when it might still be feared, that the cold would hurt them, and benumb their delicate limbs. When the juices of the flowers which begin to blow have not yet been sufficiently digested by the sun, so as to furnish honey in plenty, the bees still gather some little for their food. But their cares and activity redouble very evidently during spring and summer. They do all they can; and despise not small profits, provided they can only increase a little their provisions. In the building of their cells, they are so indefatigable, that we are assured, that a honey-comb of double cells, back to back, such as three thousand bees can lodge in, is dispatched in twenty-four hours. This whole work is divided amongst the members of the republic.

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While some of the bees are gathering the wax, preparing it, and filling the magazines, others are employed in different works. Some take the wax, and make use of it to build their cells; others knead it, polish, and purify it; others gather the honey from the flowers, and lay it in the hive for their daily subsistence, and for future occasions. Others close, with a covering of wax, the cells, in which they keep their winter provision of honey. Some carry food to their young, and close with wax the cells of the little ones, that are near the time of transformation, to prevent their being disturbed in working their way out. Some closely stop up, with a sort of bird-lime, all the chinks and holes in the hive; and cover all the weak places, that neither the wind nor little insects may find entrance. Some drag out of the hive dead bodies which might infect them; or, if these dead bodies are too heavy to be carried away, they cover them over with bird-lime or wax, and cement them in such a manner, that, in corrupting under that crust, they cannot occasion any bad smell. But it is not enough to admire the activity of these little creatures: it ought to give us emulation, and serve us as a model, considering the proportion between us. We have many more motives for diligence than those insects. We have an immortal soul of inestimable value. With what application ought we to labour for its happiness, and to avoid what might lead to its total ruin! What is more calculated to excite us to activity and indefatigable diligence, than the considering, that the fruit of our labours does not merely extend to a few days and years, but to eternity itself? The bee gathers honey not only for herself, but for her superiors; whereas, in applying ourselves to wisdom, we labour for ourselves,

selves, and we gather fruits for everlasting life. Let us, therefore, never be slothful or idle in doing good; but let us acquit ourselves of the duties of life with zeal and fidelity.

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MAY XII.

HOW PROVIDENCE HAS PROVIDED FOOD FOR ANIMALS.

FROM the elephant to the mite, there is no earthly animal which can live without food and nourishment; from the eagle to the gnat, no bird can do without it; from the leviathan to the smallest worm, no reptile can subsist without eating; from the whale to the oyster, there is no animal in the waters, to which food is not necessary. But, in forming these creatures thus, God has at the same time ordained, that there should always be an abundant great variety proper for their sustenance. As many species of animals as there are, so many sorts of food are there for them. There is no beast on earth, that does not find the food adapted to its nature. We may, in this respect, divide animals into three chief classes. The first comprehends those that feed on the flesh of others: Some, like the lion, love only the quadrupeds; others, birds, as the polecat; others, again, only fish, like the otter; and, lastly, some love only insects, as several of the birds do. There are some exceptions in all these; but in general, it is certain, that each species has its particular food designed for it by the Creator. The second class includes the animals which seek their food amongst vegetables. Some animals prefer

prefer grass; others fruit trees; and amongst those which love the same plant, there is still a very remarkable difference. Some only feed on the root, others on the leaf; some love the stalk or body of the plant; others the marrow or seed, or the whole fruit; there are some also which eat the whole plant. Those that feed on minerals belong to the third class; they are mostly insects; and it is rather difficult amongst them to ascertain what food such and such sort in particular require; because those little animals cannot be so easily observed as others. It is known, however, that some of them feed on earth, others on stones. And if we consider that there is scarce any beast or plant, which does not serve as food to some animal, we shall easily conceive that it must be the same in respect to the mineral kingdom; and that there is nothing there which does not serve directly or indirectly as food for some insect. I here comprehend the words of David: "The eyes of all wait upon thee, O Lord, and thou givest them their meat in due season. Thou openest thine hand, and fillest all things living with plenteousness." The cares of Divine Providence are evident proofs of that eternal goodness which extends over the whole universe. Reflect on the prodigious number of animals which exist. How many millions of species of birds and insects, and how many hundred millions of each sort! How many millions of animals live in all parts of the earth! How many hundred millions of each kind find dwelling and food in the forests, the fields, the mountains, and valleys, in the caves and hollow parts of rocks, upon trees, and in trees, in turf, in stones, &c. What innumerable shoals inhabit the ocean! What immense numbers of fish swim in the sea,

and in rivers? All these creatures find their daily food. How inexpressible the multitude! How astonishing the variety of insects which every where surround us, millions of millions repeated! Insects in the air, in plants, in animals, in stones; insects in other insects! All of them constantly find their daily food. How infinitely also does the wisdom of the Creator shine forth, in his manner of providing for all these animals? He gives them all the food fit for them, and adapted to their nature; for each kind of food does not indifferently suit all animals: A particular sort is required for quadrupeds; another for birds; others still for fish and insects. This distribution of food is a means wisely ordained by the Creator, to afford sufficient food for each species of animals, and to prevent any of the sustenance, which the earth produces, from being useless. But if God so provides for animals void of reason, what will he not do for man! Such is the conclusion we may, and ought to draw, from seeing the plan of Divine Providence, which gives to all the beasts of the earth every thing necessary for their support. Oh man of little faith! anxious, restless, discontented man! go and reflect on the goodness with which the Lord sustains the lives of animals; and let that teach you to be content, and trust in God. Behold the birds in the air; the fallow-deer on the rocks, and in caves; the fish in the sea; the animals in the fields and in the forests; every thing finds food and habitation fit for it. Great in the smallest things, as well as in the largest, God does not disdain or neglect the lowest worm. Is it possible, then, that man alone should not be the object of his paternal care?

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MAY XIII.

THE SENSES OF ANIMALS.

IN all animals the organs of the senses are disposed in a manner conformable to their nature and design. It is by their means, that they take in knowledge of objects, either near or distant, and that they are enabled to provide necessities, and to guard against dangers. By the feeling, animals form an idea of corporeal objects, as soon as they touch them. This sense, in beasts, as well as in mankind, has its seat under the outward skin, the extremities of which are covered with a multitude of nerves and sinews. It cannot be exactly ascertained what revolutions the feeling goes through in the greater number of beasts. It is even doubtful, if insects are not endowed with another sense, and if their horns may not be organs of an unknown sense which men are entirely deprived of. Birds, fish, serpents, and some other animals, appear not to have it. The organs of taste are principally the tongue and the palate, which receive the impressions of relish ; but the *papillæ* are the immediate instruments of it, as likewise of the touch. There is, accordingly, much analogy between these two senses. The smell has for its organ the membrane which lines the nose. It is by means of a collection of small nerves there, that they perceive part of the odorous vapours which swim in the air. Animals, who require a nicer and keener smell, are therefore endowed with a greater perfection of this organ. Worms appear entirely without any, and perhaps also fish and insects ; but it is possible, that, in the latter, the horns may be the organs of smell.

By means of this sense, beasts find all that is necessary for the preservation of their life; birds and reptiles their food; and many animals are warned by it of the approach of their enemies. The hearing conveys to animals the fluttering and vibrations of the air. The construction of the ear is not the same in all beasts. Some, like the lizard, have two drums. Some are deprived of several parts which most other animals have. It is thought, that neither birds nor fish have that part which is called the snail, or shell, and that insects and worms are absolutely deaf. The eyes are the organs of sight. Except the cuttle fish, the hedge-hog, and perhaps a few others, all reptiles are without eyes. Almost all insects, on the contrary, have more than two. Most of them have them in profusion, generally collected into two orbits. The spider and scorpion have eight eyes. In one fly there has been reckoned 16,000 eyes, in a scarab 6362, and even 34,650 in a butterfly. The number and position of those eyes make the insects amends, for not being able to move or turn them. The fish have none of the watery humour; but their chrystalline is almost entirely round. All the organs of the senses are evidently disposed, in a manner conformable to the make of animals, and their several wants. As the eyes of most insects are immoveable, nature, to supply the defect, has given them horns, by means of which they discern dangers, which would escape their sight. The eyes of fish are disposed with equal wisdom. A full projecting eye would not suit them, for which reason their cornea is quite flat; but, to remedy this defect, the Creator has given them a crystalline perfectly spherical: whereas, in animals that live in the air, it is lenticular, and consequently flatter. Although
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the form of all eyes is round, there is a visible difference in this roundness. The situation even in the head is infinitely varied, according to the different designs and wants of animals. In man, who sees little but what is before him, the eye is placed on the fore part of the head, but so contrived, that he can receive the impression of nearly the whole semi-circle of objects before him. In birds, on the contrary, the eye is placed in such a manner, that it admits almost the whole circle of the objects around it : From thence, they are better able to get their food, and to shun the dangers to which they are exposed. The human ear has the form best adapted to the upright posture. In the birds, it is more proper for flight without projecting, that it might not interfere with their progressive motion ; but close and covered, in order to leave them a free passage through the air.

What wisdom ! what economy ! what admirable art, in the arrangement, and the whole disposition of the senses of animals ! But perhaps we only know the smallest part of this wonderful mechanism ; and, undoubtedly, most of our observations, in this respect, deserve less the name of discoveries than that of probable conjectures. If we could have a more perfect knowledge of the interior construction and use of the senses of animals, we should have still more reason to admire the wisdom of God. Let us, at least, employ the little we know of it, in praising and glorifying our common Creator. The more imperfect our knowledge of animals is, the more we ought to abstain from looking upon them with indifference and contempt. Let us rather consider them as a mirror of the divine power and wisdom. For even the animals afford us incontestible proofs that

the Lord, who has made them, as well as us, is great in counsel, and abundant in means.

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MAY XIV.

ORDER IN THE SUCCESSION OF FLOWERS.

EACH plant appears on the earth in the order prescribed it. The Creator has exactly fixed the time in which one is to unfold its leaves, another to blossom, and a third to wither and fade. We have seen, some weeks past, the white winter blossom, or early violet, spring up. A long time before the trees ventured to open their leaves, and when the earth was still covered with snow, it dared to peep out ; and was the first of all the plants, and the only one, which delighted the eye of the florist. Next appeared the saffron blossom, though timidly, because it was too weak to bear impetuous winds. With it appeared the sweet violet, the auricula so admired for its brilliant colours, and the variety of its species. All these plants, and some others which appeared on mountains, were the vanguard of the army of flowers ; and their arrival, so agreeable in itself, had, besides, the merit of proclaiming the coming of a multitude of other flowers. We now see in reality, the other children of nature appear, not all at once, but in a regular succession. Each month displays the ornaments peculiar to it. The tulip begins to unfold its leaves and its blossoms. Soon the beautiful anemone will form its dome, and grow up round and full. The ranunculus will display all the magnificence of its leaves, and will charm our eyes with the most beautiful mixture

ture of colours. And to crown the lovely assemblage of flowers, the rose will open and bloom with all the beauties which distinguish it. The carnation will shew itself with the elegance which makes it so superior to its companions.

Let us pause here, and reflect on the wise and beneficent designs evident in this succession of flowers. If they were all to blow at the same time, there would sometimes be a great superfluity of them, and, at other times, a total want. We should scarce have time to observe half their beauties, and we should too soon be deprived of them. But now, that each sort of flower has its appointed time and place, we may, in this pleasing succession, examine them, enjoy their charms at leisure, and acquire a fuller knowledge of them. This beneficent and wise attention of Providence procures one more very great advantage. It not only presents to us each flower in all its beauty, but it makes up for the frailty of all those lovely productions of nature: For though there are always some flowers fading, there are continually fresh ones coming to adorn our gardens, and to afford us uninterrupted pleasure. What goodness in our Creator, thus to favour mankind with a constant train of benefits? What goodness, not only to multiply his blessings, but to render them continual and lasting! He literally leads us through paths of flowers. Wherever we go, they spring up under our feet, that the sight and enjoyment of them may enliven and soften the pilgrimage through life. The same order, in which plants and flowers succeed each other, is also seen in the human species. From the beginning of the world, the generations of men have succeeded one another on this great theatre, in the order, time, and place allotted them by the Creator. In the mo-

ment that some are born, others are returning to dust. While one is preparing to be useful to the world, another, who has already acted his part, is going off the stage. Who knows when his turn will come? Let us ever be prepared to resign our place with the tranquillity of a good conscience.

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MAY XV.

THE ZOOPHITES.

THE zoophites, or animal plants, are nothing but insects; though by their outward form, their immobility, and their manner of propagating by buds and seeds, they are very like real plants. These animals, as well as plants, can be multiplied by slips, and by ingrafting. Their animal nature only shews itself by the sensibility and voluntary motion observed in them. Most of the zoophites hold by a sort of root to the sea, or the waters they live in. Some inhabit stony and chalky places; others are surrounded with a shell, more like horn; and lastly, some are entirely soft and fleshy. They have this all in common, that, without any preceding connection, new zoophites spring out of the surface of their bodies. While these young animals are fastened to the stalk, they form together one single animal. They are nourished by it, and nourish it by turns. But as soon as they are loosened from the stock, they have their separate existence. The zoophites also multiply in another way, which much resembles the generation of plants. There forms a sort of bud which contains a young animal, which grows some time with the stalk, but at last falls off,
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and becomes a complete animal.—Should one ever have supposed, that there were animals whose form was so like plants, and to spring up like them? From the ideas we have always had of the nature of animals, could one ever have suspected, that in an animal, the brain, the heart, the stomach, and all the intestines necessary to life, should produce themselves? Could one imagine the existence of an animal, which has neither brain, nor heart, nor veins, nor arteries; which, from the mouth to the opposite extremity of its body, is but a hollow bag; which appears to be all stomach, all intestine, and whose very arms and legs are stomachs and intestines? Could one form an idea of an animal that could be ingrafted like a plumb-tree, turned inside out like a glove, and produce its young as a stalk shoots its branches? It is not fifty years since any man who would have hazarded such ideas must have passed for a madman. And yet, it is now incontestible, that there are such animals, who, not only by their outward form, but also by their manner of being perpetuated, resemble plants. By this discovery, made in the first half of the present century, natural history has gained a great deal. It may even be said, that it has enlarged our ideas of the power of God. Since the discovery of animal plants, we have a new proof, that God has distinguished his works by very small degrees; and that it is almost impossible to determine exactly where the animal kingdom ends, and where the vegetable begins. It is generally believed, that the difference between plants and animals consists in the former having neither sensibility nor motion, and the latter having both. That is then the distinguishing character between plants and animals; but how faint the shade, how slight and almost

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imperceptible

Eternal Being ! who can conceive the immense extent of thy dominion ? Who can even know the whole of any single part of it ? What wonderful things will be discovered in future ages, that are now concealed from us ! But what is already visible to us, sufficiently convinces us of thy infinite greatness.

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MAY XVI.

THE PLEASURE OF CULTIVATING FIELDS
AND GARDENS.

THE culture of fields and gardens is one of the most agreeable employments, and perhaps the only one that is compensated by a thousand pleasures for the trouble it gives. Most works confine men to a room or shop; but he who devotes himself to country pursuits is in the open air, and breathes freely upon the magnificent theatre of nature. The blue sky is his canopy, and the earth enamelled with flowers is his carpet. The air he breathes is not corrupted by the poisonous vapours of cities. A thousand agreeable objects present themselves to his sight; and, if he has any taste for the beauties of nature, he can never want pure and real pleasures. In the morning, soon as day-break again opens the brilliant scene of the creation, he hastens to

to enjoy it in his field or garden. The dawn proclaims the near approach of the sun. The grass springs up again revived; and its points shine with dew-drops, brilliant as diamonds, emeralds, and sapphires. Delightful perfumes, exhaled from herbs and flowers, embalm and refresh him on every side. The air resounds with the songs of birds, expressive of their joys, their loves, and their happiness. Their concerts are hymns of praise to the Creator, whose blessings they feel, in the agreeable light and heat of the sun, the relish of their food, the sweet instincts of nature, their alacrity and joy.

Would it be possible, at the sight and sense of so many pleasing and affecting objects, that the heart should not be touched with delight, with love, and gratitude towards God? Can the mind have a more pleasing employment than that of contemplating and praising the sublime perfections of God, the greatness of his designs, and the beauty of his works? What contributes still more to render agriculture and gardening particularly agreeable, is the infinite variety of objects it affords, of works and employment, which attach us to it, by constantly affording new ones, and preventing the distaste inseparable from sameness. There is great variety of shrubs, fruits, herbs, and trees, which we plant, and which present themselves to us under a thousand different forms. Nature presents the husbandman with numberless agreeable changes. Sometimes he sees the plants springing out of the earth; others rising high, and unfolding themselves; others, again, in full bloom. Wherever he turns his eyes, he discovers new objects. The heavens above, and the earth beneath, afford him an inexhaustible fund of pleasure and delight.

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Bless, bless the Lord. Praise his works, and trace him in every field, and through every operation of active nature. It is he who ordains the return of spring, and tells the harvest when to fill with corn the granaries of the righteous and unrighteous man. O! when the soft breath of the zephyrs (emblems of his goodness) comes in spring to cool the air, let us think of him: When in autumn the boughs of the trees bend under the weight of his gifts, let us remember him. He crowns the year with his blessings. He is the source of all good. He sends the rain to water the barren field; and it is through him alone, that the earth becomes fruitful. Praise the Lord. Behold, the forest, the river, and the vale! they all discover traces of his goodness. We find him in the meadows, and in the enamel which adorns them. Every where we trace the Lord.

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MAY XVII.

THE TULIP.

OF all flowers, the tulip has certainly the finest form. There is no silk-mercator, who, in the variety and beauty of colours, or the mixture of light and shade in his silks, can approach to the perfection of this flower. The height of the tulip, its form, its colours, its drawing, make it the queen of flowers. And if we consider, that every year there blow millions of tulips, which all differ from each other, the proportion and beauties of which are infinitely varied, we must have lost all feeling, not to be struck with admiration. Certainly, to be convinced of the existence of a wise and good God, we need only contemplate a tulip

tulip in full bloom. Is it possible, that such a master-piece of nature could be produced by a blind chance? It is true, that, at present, the tulips are produced and perpetuated by roots. But from whence came the first production of this machine, and that first arrangement, of which all the following revolutions are only the consequences? Must we not necessarily admit an intelligent Cause, whom we call the Creator of the world? It requires as much wisdom and power to create one tulip, from whence ten others proceed, as to create ten of them at once. For the new comers must have existed already in their fore-runners; and it is evident that their form and number must have been determined. Therefore, when we look at a bed of tulips, let us not limit ourselves to the admiration of their beauty, but let us admire, above all things, the infinite wisdom of God, who has traced the drawing of these flowers, and executed them in such perfection. Whatever charms the tulip has, it loses a little of its value, in being merely formed for the eye, and having no sweet smell. When we compare the carnation to it, which, joined to the beauty of its form, has the most exquisite perfume, we soon forget the gaudy dress of the tulip. Such is the fate of persons who are endowed with beauty, and set off their charms with every ornament, but have neither good sense nor a good heart. It is much more desirable to have fewer outward beauties, with an amiable mind. The former captivates but for a very short time, while the beauty of the mind remains, when all the charms of form are fled; and the esteem which our virtues inspire is constant and durable. A virtuous soul is pleasing both to God and man. It is formed by the rules of wisdom, and its ornament is innocence. The perfume

fume of good works is spread around wherever it exists, and it will one day be transplanted into the garden of Paradise. One observation which the history of plants affords us, is, that the more beautiful a flower is, the sooner it fades. In a short time, nothing of that blooming tulip will remain but a withered dead stalk. Its life and beauty last but for a few weeks; age destroys its charms; its leaves fall off; its colours fade; and the tulip, before so like a beautiful virgin, is no longer any thing but a frightful skeleton. What an useful lesson is this for us? See how little we can depend on exterior charms! How uncertain and frail is beauty! How near are we to death! for what is our life but the life of a flower? We sometimes resemble it in beauty, but we resemble it likewise in the shortness of our days: for "Man, that is born of a woman, is of few days, and full of trouble. He cometh forth like a flower, and is cut down." Let us so live, that when that time comes, good people may regret us, and weep over our graves.

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MAY XVIII.

REFLECTIONS ON GRASS.

HOWEVER beautiful the flowers may be which are cultivated in gardens through the care and industry of man, we should know but little of the wonders of the vegetable kingdom, were we to limit our researches to the contemplation of a flower garden. Each field is a scene of the wonderful works of God. In the first place, can any thing be more astonishing than the prodigious quantity

quantity of grass in a field? Suppose that a field was no more than a thousand paces long, and of equal breadth, its surface would be a million of feet square: Now, if we suppose, that in making a step, we cover only ten blades of grass, there must be in each square pace an hundred of these blades of grass; consequently, in casting a glance on that field, we see at once an hundred millions of these machines so curiously formed. Let us give to each blade of grass but an hundred veins, by means of which it draws nourishment from the earth, there would be, by this account, ten thousand millions of regular and perfect veins. But who can suppose, that it would require only an hundred veins for its nourishment and growth, when each blade of grass is a series of nothing else? How immense a multitude of them must there be in the field! And how small, in comparison, is the number of the plants and flowers, which grow and are cultivated in gardens! Why has the Creator so prodigiously multiplied the productions of the vegetable kingdom? Why, from each sort of grass, does he cause to spring such a numerous multitude? It is, undoubtedly, that beasts as well as men may find sustenance. The fields are, properly speaking, the magazine for animals. Another circumstance worthy of observation, in respect to grass, is, that it neither requires sowing nor tillage, but grows perpetually independent of our care.—How sad and barren would our pastures and meadows be, if we were loaded with the care of sowing the grass-seed, and of afterwards watering what our hands had sowed and planted? But at the creation of the world, God so provided, that a sufficient quantity of grass should never fail. From that almighty word of the Creator (“ Let the earth bring forth
“ grass,

“grass, the herb yielding seed,”) proceeds the constant fertility of our fields. To reflect on the colour chosen for the grass, is sufficient to make us sensible of the wise and beneficent care of the Creator. If all those fields were red or white, who could long bear the dazzling light of them? If the predominant colour was darker and more gloomy, what a melancholy appearance would all nature have? The green is between both colours; it agrees with our eyes, and pleases and refreshes them. It is also remarkable, that, in this colour, there is such variety of shades, that there is not a plant, the green of which is exactly as pale or as deep as that of another. It is then evident, that, in the arrangement of the vegetable kingdom, God has not provided less for our pleasure, than for our convenience. This double attention is well calculated to convince us of that supreme goodness and wisdom which extends over the whole earth. May the proofs of it, which daily present themselves to our sight, never make us cold or indifferent to it. On the contrary, let us employ that reason which we owe, to God, in making ourselves, through all his works, acquainted with that infinitely wise and merciful Being. Every time we walk in the fields, let us indulge these meditations: Lord! with what wisdom hast thou formed these plants! With what goodness dost thou not dispense both rain and sunshine for the growth of herbage! Greens and simples which strengthen our bodies; milk, which affords us a food so sweet and wholesome; the flesh of animals, which we enjoy in such abundance; all these advantages, and many more, thou grantest us in the use of the fields. I bless thee for them, O God my Creator! and will bless thee evermore.

MAY

MAY XIX.

SENTIMENTS WHICH THE CONTEMPLATION
OF THE SKY EXCITES.

WHAT, but a Spirit of unlimited knowledge and power, could form that superb vault over our heads? Who could have given motion to those immense globes; that perpetual motion, whose swiftness is inexpressible; a motion, which even the smallest grain of sand could not have of itself? Who ordered those enormous masses of heavy and lifeless matter, to take so many different forms? From whence proceeded that connection, that beauty and harmony, which shines through every part of the whole? Who regulated all things so exactly, according to number, weight, and measure? Who prescribed to those immense bodies such laws as none could discover, but a mind endowed with the greatest wisdom? Who measured those vast circles in which the stars move, without going out of their line? Who put them into the course they run, and which they are to run, without interruption? All these questions lead us to thee, thou adorable Creator! self-existing, independent, and eternal Being! It is to thee the celestial bodies owe their existence, their laws, their arrangement, their power, and all the advantages they procure to the earth. What sublime ideas must rise in our souls, when we think of these great objects! If the space, in which so many millions of worlds move, cannot be measured by our understanding; if the globes, which take their prodigious courses there, are of a size to astonish us; if the fabric of the universe, constructed by the Creator, is of such immensity

immensity, that our ideas are lost in it, what must thy greatness be, O God ! and what understanding is able to conceive it ! If the heavens and all their host have so much magnificence, beauty, and majesty, that the eye can never be satisfied with contemplating, nor the mind with admiring them, what must be thy beauty, thou eternal Being, of whose splendour and glory these creatures are but faint and imperfect shadows ! What must be the incomprehensible extent of thy knowledge and understanding, since thou seest with one glance the whole immense space, all the numberless bodies in it, and art so intimately acquainted with the nature and properties of all the beings thou hast placed there ? What depths of wisdom and knowledge must be in thee, O Lord ! who hast formed such admirable plans ! who hast measured, and calculated every thing with so much exactness, that nothing can be added or taken away ! Who didst conceive and establish the several laws, which all the globes were to observe ! Who didst employ the wisest means to accomplish them ! And who wast capable of forming such connection, relation, and harmony, through all thy works ! How great must thy power be, to be able to realize all these plans ! to guide and direct the most immense bodies ! to animate all by thy breath ! and to preserve all by thy almighty word !

But can God have given us such proofs of his greatness and glory in vain ! Shall it be to no purpose, that the celestial bodies declare the infinite knowledge and wisdom of the Almighty ? Shall they in vain pour upon us the abundance of blessings which the Divine Goodness bestows through their means ? Is not all this done, in order that intelligent creatures should take notice
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of it, reflect, and make it the subject of their contemplations? Masterpieces of a skilful artist are admired; what stupid indifference would it be, not to admire the infinite art and wisdom manifested in the works of the Most High! Those are honoured, who have talents to perform great and beautiful works: With what respect, with what profound humility ought we not to prostrate ourselves, and adore that God who constructed the magnificent fabric of the universe, and displayed so much majesty and glory in it? The heavens declare his greatness, and proclaim him Lord of all the world. All the celestial bodies obey him, and all their revolutions are made according to his laws. And shall man alone refuse to obey this Governor of the universe, who is also his Lord and his Creator? Shall he refuse to be guided by laws so wise and useful to him? On every side the effects of Divine Goodness flow in upon us, and bring us innumerable blessings, comforts, and pleasures. What love, what gratitude do we not owe him! With what earnestness ought we not to imitate David, who cries out, on contemplating the works of the Lord, "I will magnify thee, O God, my King! and I will praise thy name for ever and ever! Every day will I give thanks unto thee, and praise thy name for ever and ever. My soul praise the Lord. Hallelujah!"

MAY XX.

FRUITFULNESS OF PLANTS.

THE magnificence of the earthly creation shines in nothing more than in the astonishing fertility of plants. One single plant can produce thousands, even millions of others. One tobacco plant may yield forty thousand three hundred and twenty grains of seed ; and, if we calculate in proportion the produce of four years, we shall find, that, from one single grain, there may spring two millions six hundred and forty two thousand nine hundred and eight billions, two hundred and ninety-three thousand three hundred and sixty-five millions, and seven hundred and sixty thousand grains of seed. An elm, twelve years old, has often five hundred thousand grains of seed : what a prodigious number would that produce in a few years ! Suppose the tree had but an hundred thousand buds, and that the shoot of each year contained but five of them, there would be every year five hundred thousand plants, which may be considered as new. If we add to that what is produced by the increase of the root, by ingrafting, &c. we shall only be surprised, that the earth has not yet been consumed by plants. But we must remember the numerous multitude of animals, who owe their food to the vegetable kingdom. They annually consume so great a quantity of plants, that, if nature had not endowed vegetables with very extraordinary prolific qualities, there would be reason to fear their total destruction. But whilst animals are destroying them, they often propagate them at the same time. While they consume certain sorts of fruit, they scatter the seeds about, and often to a great

great distance. This dispersion is necessary, in order that only one sort of plant should not fill a whole field. It is with the same design, that some seeds have little feathers or wings, to be dispersed about by the wind. It is certain also, that, in general, the plants are more fruitful than animals. This may be proved, by comparing trees with four-footed animals. The former produce annually, sometimes for several ages, a great number of new trees; whereas the greatest quadrupeds, such as the elephant, the mare, &c. have but one, or at most two young ones, and are often barren. The lesser quadrupeds, such as the dog, the cat, the rat, &c. are much more fruitful; but still not to be compared to the fertility of trees. Fish and insects approach nearer to it: Tench lay about ten thousand eggs; carp, twenty thousand; and cod, a million. Now, compare that fruitfulness to the wild rose, mustard, or fern, and it will be found, that those plants, and many others, multiply much more than either fish or insects, particularly if it is observed, that almost all plants multiply in several ways, whereas most animals have but one way of propagating. A tree may produce as many new trees as it has branches, boughs, and even leaves.

With what wisdom, therefore, has God proportioned the animal and vegetable kingdoms! If the multiplication of vegetables was less considerable, a great number of animals would die of hunger; our fields, our meadows, and gardens, would be deserts, with only some few plants scattered here and there. On the other hand, if the Creator had ordained, that the granivorous animals should increase more than the plants, the vegetable kingdom would soon be exhausted, and several species of animals would be at an end. But, according to
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the relation between the two kingdoms, the inhabitants of both multiply in proportion, so that no species should perish.

Thus, O man, abundance and pleasure surround thee on every side; for it is for thee that the Creator has made the vegetables so astonishingly fruitful: It is for thy support, thy pleasure, and thy health, that he has produced such variety of plants, and in such great abundance. Count, if you can, what covers one single field; their number is inconceivable; and this innumerable multitude is an image of the immensity and omnipotence of the Lord; who, throughout all nature, "openeth his hand, and filleth all things living "with plenteousness."

MAY XXI.

DESCRIPTION OF THE BEAUTIES OF SPRING.

NOTHING is more worthy of admiration than the revolutions which spring occasions upon our globe. In autumn, every valley, field, and forest, present us with the image of death; and, in winter, nature is deprived of every ornament. All the animals are melancholy; the inhabitants of the forest conceal themselves, and are silent: the earth becomes a vast solitude, a desert, a grave; and nature appears to be fallen into a state of lethargy and insensibility. In the mean time she silently labours, whilst we, alas! forget the secret influence of Divine Power, preparing for us the renewal of nature. All that appeared dead is again animated, and every thing waits for the same revival. In the trees alone, what endless changes

changes take place ! First, the sap (which in winter had entirely forsaken the trunk and branches) rises slowly up through its invisible channels, and particularly under the bark, through ways which can only be guessed at, but not discovered. This sap serves to swell the buds : and how many treasures of the Divine Power are there not contained in those little recesses ! the leaves, with their cheerful green ; boughs which are to pierce between the leaves when opened ; new buds upon those boughs, full of leaves, though still invisible ; then, that multitude of blossoms, with the sweet exhalations which embalm the air ; in those blossoms fruit ; and in the fruit the seeds of an infinite number of other trees. The cheerful light of the sun transports and animates the soul ; and the activity of nature, in the plants around us, charms the sight. There is not a field, which does not present a beautiful landscape to the eye, and flowers to the smell. Almost every bird sings its hymn with more or less melody. How cheerful the song of the linnet, hopping from branch to branch ! She extends her voice, as if she had formed the design of particularly drawing the attention of man, to delight him. The sprightly lark rises in the air, and seems to salute the day and the spring with her shrill note. The cattle, by their various cries, express the joy with which they are animated. In the rivers we see the fish, which, during the winter, had fallen frozen and motionless to the bottom of the water, now rising near the surface. They have recovered their former vivacity ; and their pliant, gentle, pleasing motions, amuse our sight. Oh ! how can we so often behold all these objects, and not continually feel the most profound and respectful admiration of the greatness of that eter-

nal Being, whose power so gloriously manifests itself! O! let us never contemplate a tree crowned with leaves, a field covered with waving corn, a meadow enamelled with flowers, a majestic forest; let us never gather a flower, nor walk in a garden, without recollecting, that it is God who gives us the delightful shade of trees; that it is he who makes the flowers so beautiful, and gives us their perfume; that it is God who clothes the woods and meads with their beautiful verdure, so pleasing to the sight; God who gives life and happiness to every creature; God, through whom we have our existence, and enjoy the sweets of spring.

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MAY XXII.

THE LANGUAGE OF ANIMALS.

MAN, properly speaking, is the only animal who can be said to have language; and it is particularly by this circumstance that he shews his superiority over all other animated beings. It is by means of speech that he extends his empire over all nature: that he rises towards his divine Author: contemplates, adores, and obeys him. It is by this faculty, that he learns to know himself and all the creatures around him; and to make them serve for his use. Every animal but man is deprived of this faculty, because they are void of reason; and it is reason which capacitates us to learn languages, and the use of speech. But as animals make their wants and feelings known by natural signs; as they utter certain sounds, which express the sensations that affect them,

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one may so far allow they have a sort of language. The variety of these tones, their number, their use, and the order in which they follow one another, form the essential parts of their language. To form a just idea of it, it is not necessary to have recourse to deep researches : it is enough to observe the animals daily before our eyes, and with whom we have a sort of intimate connection. Examine the hen with her chicks : if she finds any food, she calls and invites them to it. They understand her and come instantly. If they have lost sight of this tender mother, their plaintive cries express their anguish, and desire to see her again. Attend to the different crows of the cock, when a stranger or a dog comes into the poultry-yard, when a kite, or any other enemy appears, and when he calls or answers his hens. What do these lamentable cries of the turkey mean? See her chicks all on a sudden concealing themselves, and lying so quiet, one would say they were dead. The mother looks up to the sky, and her anxiety increases ; but what is it she sees there? A black speck, which we can scarce distinguish ; and this speck is a bird of prey, which could not escape the vigilant and piercing eyes of this mother. The bird of prey disappears. The hen gives a scream of joy. Her anxiety is at an end. The chicks revive, and gather again happily about their mother. There is such variety in the language of the dog, it is so rich and fruitful, that it would be enough of itself to fill a dictionary. Who can be insensible to the joy that this faithful servant shews at the return of his master. He jumps, he dances, he runs here and there, turns quick and lightly round his master, stops all at once ; fixes his eyes on him, with the greatest tenderness ; draws near him ; and licks and ca-

resses him repeatedly. Then, beginning his play again, he disappears, and returns dragging something after him; puts himself into all sorts of pretty attitudes; barks; tells every body how happy he is; and shews his joy a thousand ways. But how different are these sounds, from those noises he makes at the sound of a robber, or those he makes on seeing a wolf. If we follow a dog in the chace, we see how he makes himself understood by all his motions, and particularly with his tail. How well adapted his signs are to the discoveries he wishes to make! This affords us an opportunity to admire the wisdom and goodness of the supreme Being. What beneficent attention he has shown towards animals, in granting them the power to express by sounds their wants and feelings! From their organization, and the nature of their souls, it was impossible they should speak the human language; but they would have been much more to be pitied, and less useful to us, if the Creator had entirely deprived them of the power of making themselves understood. To compensate them for the want of speech, he endowed them with the address to communicate, by a thousand little ways, their feelings to one another, as well as to mankind. He has given them organs proper to produce and vary a certain number of sounds; and their make is such, that each species has particular and distinct sounds, by which they make themselves understood. In a word, the Creator has given as much force to the language of animals as their nature would admit of, and all that the end for which they were created required. The language of animals consists only in a number of inarticulate and imperfect sounds. They have no ideas, but those prompted by their senses; because they are incapable of learning a methodical

methodical language. They only know objects by some qualities evident to their senses, to which all their judgements and comparisons are limited. As for us, we possess faculties in all respects much superior. We can rise to general notions, and separate the object from the qualities which distinguish it. We can, by means of an infinity of sounds (articulate and arbitrary), express all our conceptions. We can learn the connections which unite us to other beings, act in consequence, and thus ensure our happiness.

O thou the Creator, what gratitude do we not therefore owe thee ! Grant that we may never forget this important part of thy blessings ; but, on the contrary, that each time we make use of speech, we may reflect on the excellence of our privileges, and the greatness of thy wisdom and goodness.

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MAY XXIII.

THE GREATNESS AND NUMBER OF THE CREATURES
ON THE EARTH.

LORD, how great and numerous are thy works ! We owe this testimony to the works of God. If we only knew those which the earth contains, how great is the extent of this globe, the abode of so many different nations ! Mankind occupy vast domains ; and yet how many solitudes and deserts are there, which have never been inhabited by man ! Neither does the land, taken in the whole, fill near so great a space as the sea, that prodigiously extensive element. But if the earth in itself is an example of the greatness of the Almighty's works, we cannot cast our

eyes on the creatures it contains, without admiring the number and variety of them. In the first place, we find innumerable sorts of stones, minerals, and metals, concealed in the earth; then, what astonishing variety among the trees, the plants, the fruits and simples, which cover its surface! Notwithstanding all the pains that have been taken, to observe and class the different sorts of vegetables, it has never been compassed, nor will all the future efforts of naturalists arrive at it. Let us next consider the living creatures. What immense variety of them there is between the eagle and the gnat, the whale and the gudgeon, the elephant and the mouse! The disproportion is prodigious, and yet the whole space between them is filled with living creatures. The animal species come so near one another, that it is sometimes difficult to distinguish the one from the other; yet that species is so multiplied, that, from the gnat to the elephant, they form a sort of chain, in which, each link holds by the preceding one. In seas, lakes, and rivers, on the surface and in the bosom of the earth, there is no place, which, some way or other, does not contain a living creature. Yet, however great the number may appear of the animals visible to the naked eye, they cannot be compared to the number of those, which are too small to be seen without a glass. By the help of the microscope, almost incredible discoveries have been made, of which all may be convinced. There, in some measure, a new world presents itself, which was before utterly unknown to us. There, such living creatures are seen, that imagination itself can scarce form any thing so extremely small, since one of them is not near so large as the millionth part of a grain of sand. And it is not only their number and variety, it is also
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the beauty and delicacy of their form which ought to strike us with astonishment. What appears dull to the naked eye, or even what escapes it entirely, if it is seen through the microscope, has an inconceivable lustre and delicacy. Gildings which art cannot imitate, shine in the smallest grain of sand, but, particularly, in certain insects limbs; for example, on the head, and in the eyes of a little fly: And in the construction of the lowest of living creatures, their exact symmetry and admirable order is observable. We find, in a word, that millions of creatures, so small that the eye can scarce distinguish them, but by the help of glasses, have, notwithstanding, as perfect an organization in their species, as the greatest animals with which the earth is peopled. Such considerations must give us a lively sense of our own littleness. I lose myself in this innumerable multitude of God's creatures, who would be sufficient to witness his greatness, though I, and millions such as I, had never existed.—O Almighty! how immense is thy dominion! In every element, there are beings whom thou hast created and preserved. Each grain of sand is a dwelling for insects, who are also in the class of thy creatures, and are links of the immeasurable chain. Here my ideas are lost in infinity. The more I reflect on the greatness and variety of thy works, the more I feel the limits of my understanding. I heap number upon number, and yet I can scarce find a sum which comprehends the number of thy creatures. It is impossible to determine it. We have only to admire and adore.

MAY XXIV.

SPRING IS AN EMBLEM OF THE FRAILTY OF HUMAN
LIFE, AND AN IMAGE OF DEATH.

AT this season, we need not go far to seek images of frailty and death : they present themselves on all sides, being connected with almost every beauty of nature. Undoubtedly, the Creator's design, in this respect, was to remind us of the uncertainty of the things of this world, and to repress the dangerous propensity we have to place our affections on objects so vain as all those in nature are. Spring is the season in which the plants receive a new life, and at the same time, that in which most of them perish. Serene as the days in spring are, they are often suddenly obscured by clouds, rain, and tempest. Sometimes the morn appears in all the lustre of its charms : then, before the sun rises to mid-day, its splendour, which had flattered us with the hope of fine weather, disappears. Sometimes, also, this hope is fulfilled, and the days of spring shine in full beauty. But how transient are those serene days ! how swiftly they pass away ! They vanish, even before we have well enjoyed them. It is thus that the best of our life flies away. Often, in the morning, every thing smiles upon us, every thing promises us joy and happiness ; but, before evening, nay often before noon, we meet with vexations and shed tears of sorrow. Let us look back on those days of our youth, which we may call the spring of life. How short have been the pleasures of our youth ! how great the variety of pleasures we enjoyed ! But where are now those happy moments, those ravishing delights ?

lights? What is become of that constant sprightliness, and those roses of youth, which were seen in our cheeks? We no longer have a taste for those turbulent pleasures which then intoxicated us. What now remains of those fine days that are past? Nothing but a melancholy remembrance of them, unless we have sanctified them, by devoting them to our Creator. With what force the spring points out to us the frailty and end of life! Behold how far its charms extend! Behold the trees full of blossoms! But let us not too much exult in their rich ornaments: Shortly, they will return to that dust from whence they came. All that showy generation must die in the same spring which gave them birth. It is thus that our lives vanish. An unforeseen death hurries us to our graves, whilst the health and strength we enjoyed promised us a long course of years. Sickness and death often come upon us so much the more unexpectedly, as their approach is concealed under an appearance of youth and health. Let every one behold an image of himself in the blossoms of spring, and there read his own uncertainty. Let us address them in this language: O! ye who are endowed with such charms! ye, the glory of the gardens, and ornaments of the valleys! how transient is your bloom! But what a picture! how instructive to me! That death which I carry in my bosom, I shall soon perhaps feel its stroke. Thou rose, thou livest but a day; and as for me, I may die in an instant.

Though these thoughts ought to render us serious, yet should we enjoy both the spring of nature, and the pleasures of life, as they are bestowed upon us by the Creator; but, at the same time, let us mix with these enjoyments, reflec-

tions which arise from the nature of spring and life. The thought of death is very consistent with the enjoyment of every innocent pleasure. Far from infusing melancholy into our hearts, it should teach us to rejoice evermore in the Lord ; it should guard us against making a bad use of earthly pleasures ; it should inspire us with a desire of solid and uninterrupted happiness. The beauties of the visible world should give us an idea, what must be the infinite beauty of the invisible and heavenly world ; and finally, when the time comes, in which our lives must wither and fade away as the grass of the field, then we may say, with Christian fortitude, Though my life, like a spring flower, wither and turn to dust ; though these cheeks, wherein the roses of youth shine be a prey to corruption ; I still hope for a better life, which I shall never loose ; and the body, in which I shall then be clothed, will never decay.

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MAY XXV.

SPRING IS AN EMBLEM OF THE RESURRECTION
OF THE BODY.

MOST of the flowers we admire were once coarse and shapless roots ; but now they adorn the earth, and charm our sight. What a fine image this is of the resurrection of the righteous, and the state of their bodies re-animated ! As the roots of the most lively flowers, while buried in the earth, are shapeless and without beauty, but when in bloom have a thousand charms, so is the human body : while in the grave, it is an object
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of horror, but at the resurrection it will experience a most astonishing change : For, " what is sown in corruption, is raised in incorruption ; " what is sown in dishonour is raised in glory." As soon as spring takes place of winter, life and joy take place of the melancholy impressions which a severe season makes on the mind of man ; and the first fine days make us forget the long winter and its darkness. Thus shall we forget, at the great day of the resurrection, all the sad and gloomy days of our past lives. The clouds of affliction in this world cast a gloom upon our countenances ; but as soon as the light of a new creation dawns upon us, grief is no more ; nothing more can disturb the serenity of our souls.

Spring is the general renewal of the whole earth. However dull it was to us in winter, it is now no less pleasing and beautiful in its appearance. Every thing enchants and delights us ; and we might almost fancy ourselves every spring transported to some new and cheerful habitation. It is thus, that, at the resurrection, we shall find ourselves transported into a new, magnificent, and charming dwelling. The new heaven, and the new earth, will be free from all the apparent or real defects of the globe which we now inhabit. Peace, order, beauty, and righteousness, will make our future abode the happiest that is possible to be conceived. When the warm rays of the sun have penetrated into the earth, millions of plants and different sorts of flowers spring out of its bosom. It will be the same in that great day, when generations will rise out of the dust in which they were buried. As the spring flower rises from its seed to the height of bloom and beauty, so will our bodies, deposited in the grave, rise on that day in full glory, clothed

ed with celestial beauty. Spring is the æra of vegetation for grass, flowers, and plants. It is then, that every thing, which has sprung up out of the earth, opens every day more and more, and grows visible. So will the day of resurrection be the æra of the unlimited progress which our immortal souls will make in all that is good. No weakness will there stop us in the road to perfection. We shall rise from virtue to virtue, from felicity to felicity. In spring, all nature seems roused from sleep to praise its Author.— The songs of all the inhabitants of the air unite ; as if to glorify their Creator with an universal hymn. Similar songs of joy will be chaunted at the day of resurrection, by the elect of God restored to life. O ! with what delight will our hearts be filled ! We may judge of the greater by the less. If the earthly spring is so rich in enjoyments, what will be the beauty and treasures of spring in the new world ?

MAY XXVI.

THE ATTRACTIVE POWER OF BODIES.

WE often see two bodies draw near to one another, without being pushed together by an exterior force. The motion, which produces this effect, is called attraction or gravitation. This power of attraction proves to be one of the principal springs of nature. It is by means of this law, that fluid bodies rise up into the capillary vessels ; and it is partly the cause of the circulation of the juices in plants, and even in animals. It is true, that the power of expansion in the air contributes

contributes its share to it, at least in plants; for there is a portion of air amongst the fluid which nourishes them. Vegetables are also provided with veins, which suck in the outward air, and, at the same, time help to draw up the juices: however, attraction is certainly one of the chief causes of the phenomenon. No one is ignorant, that the human body is a series of numberless capillary vessels, where the humours are continually in motion; and this motion is partly regulated by the laws of attraction. A great number of the phenomena we observe in the corporeal world, have this attractive power for their principle; and it is the most satisfactory way of accounting for the motion of the celestial bodies. Those enormous globes, separated from each other at such immense distances, must be united by some secret connection, to form such a whole as our solar system. And it is probable, that the union of the celestial bodies, their direction, the law which obliges them not to deviate from the course prescribed them, the motion of the planets and comets round the sun, all depend on its attractive powers, and on the gravitation of the bodies which incline towards it. How admirable is that wisdom, which, by means of one and the same law, produces the vegetation of a blade of grass, and the motion of all the whole system of worlds!

These reflections naturally lead us to adore the Supreme Wisdom. If it appears in the celestial bodies, it is no less visible in the government of rational creatures. The Creator acts, in this respect, upon principles equally wise, according to the same laws, and all with the most wonderful simplicity. But, we are so blind, that we are not always sensible of it, because we do not think
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any thing worth our attention, that is not strikingly great. But why should we not see, in the things which appear to us of little importance, the traces of wisdom so evidently impressed upon them ! When cities and countries are swallowed up by earthquakes, or laid waste by fire and water, we become attentive : we then see, that such revolutions are the works of the Master of the universe ; and his wise providence is acknowledged. Does not the greatness of the supreme Being appear as much in the smallest blade of grass, and in the poorest insect, as in the motion and harmony of the spheres ? Yes, in the small as well as in the great, God manifests the glory of his attributes. It is owing to our inattention and negligence, if we do not every where see it, even in the smallest beings, and most trifling events. To be convinced of the wisdom and goodness which presides in the government of Providence, we need not go to distant objects ; we need only dwell on what relates to ourselves, and on the particular dispensations of God in this respect. Our own lives, and the events with which they are marked, may teach us how wise the means he has chosen are to make us happy ; how many little circumstances his providence has made to concur towards the execution of his designs ; and how numerous the means are which he makes use of to preserve us from evils, or to prepare for us blessings.

MAY XXVII.

COMPLAINTS OF MANKIND, RELATIVE TO CERTAIN INCONVENIENCES IN THE LAWS OF NATURE.

“ WHY is the human body, from its constitution, liable to so many infirmities and accidents ?” Whoever asks this question, let him say, if it is possible to form one’s self a body, which unites more advantages in itself, than that which we have received from our Creator. It was incompatible with nature, and the chain of things of this world, that man should have an invulnerable body. If one of our fellow-creatures is deformed, another lame, a third deaf or dumb ; is it a reason to murmur against God ? Are those defects so common as to give us reason to complain ? If, after these questions, any one should still think they have reason for discontent, let them reflect on the following truths. It is of use to men in general that they may not want examples of the defects to which the human body is liable. For, when a person, perfect and well made, compares himself with one that is crooked and deformed, he is sensible of all the advantages of well formed limbs ; he learns to value properly a gift till then unthought of, and to take more care to preserve it. How valuable is each eye, each ear, each organ of sense, each joint, each limb, if we only observe the condition of the few people who are deprived of them !— Would any of us part with a limb, in exchange for the greatest treasure ? Are not our bodies more beautiful and regular than the finest building, or the most curious machine ? And, though
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the latter are very inferior to it, we are far from attributing the assemblage of their parts to chance. "Why are the countries of the earth so different from one another, sometimes cold, sometimes damp, sometimes low, and sometimes high?" But, O man, if thou hadst the power to form a globe, wherein every thing was to be for the advantage of men and animals, would thy understanding furnish thee with a plan better than this? The countries of the earth, by means of their difference, produce variety of exhalations and winds, which occasion that mixed air, wherein, experience tells us, that men and animals live healthy and content in most places, and wherein plants also grow and propagate. "It is, however, allowed, that the variation in weather is not beneficial to all men, or to all countries." But, has not the preceding weather influenced the following, as the climate of one country often influences another. Are we capable of judging of the whole? Must a million of farmers sigh in vain for rain, because dry weather would suit the private convenience of one family? A certain temperature of the air may occasion, here and there, a transient barrenness; but, can it be called an evil, if it was necessary in order to hinder the air from corrupting? Ought the east wind, which is favourable to a whole country, to cease to blow, because its violence may cause some shipwrecks, or be hurtful to some consumptive people? Is it reasonable, when we cannot take in the whole, to find fault with a part? "Why are there so many hurtful animals?" Would it then be better to have no beasts of prey, small or large upon the earth? They put a stop to the number of animals, that would otherwise overpower us; and, it is because many animals serve for food

food to beasts of prey, that the number of living creatures increases every year. If these beasts of prey did not exist, the carcasses of the animals on which they feed, would not only be useless to living creatures, but would be hurtful. Every year, animals thus devoured, are replaced by others ; and, in most cases, population depends on the quantity of sustenance. Thus gnats, and other insects, would soon want food, if the animals, whose prey they are, did not prevent them from multiplying too fast. " Why has the Creator " regulated the course of nature by such invariable laws ? " It is in consequence of such regulations, that man's experience and labour enable him to make use of his understanding and powers, so as to be, in some measure, master of his own welfare. Would we choose to inhabit a world, where, when we were hungry, we had only to wish, and we should be satisfied ; where our clothes should fall from the clouds, if, when travelling in a cold night, we neglected providing any ? Or would we, at pleasure (without recourse to other methods) walk sometimes on the ground, sometimes in the water, sometimes in the air ; a world where the stomach should never be overloaded with the weight of food ; where an iron hatchet would swim, if, by accident, we let it fall into the water ; where bodies, going out of their natural direction, should describe an oblique line, lest their fall should hurt any body ? Would we wish to inhabit a world, where we should have no occasion to do any thing ; where we could not in any way promote our own pleasures ; where there should be no rule, no fundamental law ; where, in fine, the best, the bad, and the worst, being equally unknown, nothing could make us attend to the laws of nature ?

Doubtless,

Doubtless, there will ever be a number of things in nature, the purposes of which, or their relation with the whole, must ever be concealed from us. But on all occasions, let us rest on this principle, that God does every thing for wise and beneficent purposes. And, when these enigmas, these inexplicable things, present themselves, let us say with the Apostle, "O the depth of the riches, "both of the wisdom and knowledge of God! "How unsearchable are his judgements, and his "ways past finding out! For who hath known the "mind of the Lord, or who hath been his counsellor? Or who hath first given unto him, and "it shall be recompensed unto him again? For, "of him, and through him, and to him, are all "things. To whom be glory for ever. Amen."

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MAY XXVIII.

SINS WE ARE APT TO COMMIT IN SPRING.

IS it possible that we can profane, by sin, this season, so peculiarly formed to prompt us to the practice of piety? Would it not be natural to suppose, that, in spring, each field would be to us as a temple, where we should offer up to our Creator endless sacrifices of prayer and thanksgiving; where each thought, each sentiment, and action, should tend to his glory? But, alas! we daily see the ingratitude of man towards his heavenly Benefactor. We behold nature renewed, we behold the flowers, and a thousand other delightful objects, without thinking of him who made them all; or, if we do think of God, we forget to return thanks for his wondrous goodness.

ness. This is the reigning vice of the season, and is, at the same time, the source of all the faults committed in it. Man is the only creature on earth insensible of his own happiness; and yet he has the faculty of feeling it to its utmost extent. This must be addressed to the ungrateful and insensible heart; for what attention can be expected from those who pay so little to that God, who speaks throughout all nature in a voice so intelligible and strong! Yet how is it possible to forget our Creator! All his works proclaim him; and we can neither know ourselves, nor the world we live in, without knowing our God. Each creature reminds us of its Maker; each part of the vast scene of nature is filled with the Deity. He shews himself in each blade of grass, each flower, and bird. He constantly borrows the mild and persuasive language of nature, and addresses himself to our senses, our reason, our consciences, and all our faculties. Let us only listen to their language, and we shall no longer be insensible or ungrateful. How ought we to employ these days? It is right to leave our rooms, where we have been confined, and to go and breathe the wholesome air, and walk in the fields and gardens, in order to contemplate the beauties of the season; but let us take care not to make a bad use of them, by giving way to extravagant pleasures, which lead to folly and repentance. We shall not be able truly to enjoy the fine season of spring, till, by fixing our attention on the works of our Creator, we discover from reason his divine goodness and power. Then will our hearts experience joys much superior to the pleasures of those who forget their Maker. Why should we seek those pleasures which offend God and wound our consciences? Here are purer enjoyments, and it is
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for these only that we are endowed with reason and sensibility. In the next place, let us turn to those, who, at this season of the year, give way to too much care and anxiety. When in the depth of winter and oppressed with many wants, they grow anxious and melancholy, then they may deserve some indulgence; but, at this time, it is an unpardonable doubt of Providence. "Behold the lillies of the field, how they grow; consider the fowls of the air; they sow not, neither do they reap, yet your heavenly Father feedeth them." For whom does God cause the seed to shoot out of the earth! For whom is it adorned with flowers! For whose use does he provide each animal with food? O ye of little faith! put your trust in your Father, who is in heaven. Spring is the season of hope. Give it admission to your hearts; and, if any anxiety should still find a place there, cast your eyes on the meadows and fields, and remember the words of our Redeemer: "If God so clothe the grass of the field, and feed the fowls of the air, shall he not much more clothe you? Are ye not better than they?" Let us then employ the most agreeable part of the year in contemplating the wondrous works of God. Let the pleasures, which nature now lavishes upon us, lead us to rejoice in the inestimable advantage we have over so many millions of living creatures, of knowing him to be the Author of all happiness.

MAY

MAY XXIX.

THE HARMONY AND PATRIOTISM AMONG THE
BEES.

UNION and patriotism form undoubtedly the fundamental happiness which may, in some measure, be ascribed to bees. It is at least certain, that their republic would soon be destroyed, if they did not live in great harmony amongst themselves. Those, who have made observations on this subject, inform us, that when the bees return to their hives, loaded with materials for building, they find some of their companions ready to relieve them from their burdens. The travellers begin their journeys again: and while they are gathering more provision, the working bees who remain in the hive, knead together the little the others had brought; and thus prepare a mass proper for building. Some who are not directly employed in work, are busy in doing good offices to those that are; and bring them food, in order to let the work go on without their losing by it. This harmony nearly approaches to the patriotism observable amongst men. The riches of a nation are the riches of each citizen; and this numerous republic forms but one family. Here there is no self-interest, no avarice, and consequently no rapine. Here the bees never assemble together to use violence, and fight battles with their country people. Here we never see one bee avariciously wishing for more than is necessary, whilst another is in want: neither do they ever try to get more honey, when they have laid in a sufficient provision for the winter.

Insignificant as we reckon these insects, we may learn

learn from them virtues, on which depend the repose and happiness of our lives ! In whatever rank or condition we are, it is necessary to act in concert with our fellow-creatures as patriots. The society in which we live, Christianity, and our own happiness, require it. Let each of us cheerfully bear our part in the general burden ; and, if it is necessary, let us even take upon us the burdens of others, when, through ignorance or weakness, any may be deficient. And if it should so happen, that religion, duty, and conscience, require us to make great sacrifices to our fellow-creatures, let us take care not to consider it as an evil, but let us rather think it an honour, to be able to succeed better than them. Let no visible selfishness ever find room in our hearts. Those who seek to enrich themselves at the expence of others are contemptible members of society. When we can in any ways contribute to the general good, let us not be deterred from it by the fear of having no reward : Is not the testimony of a clear conscience, and the blessings of eternity, sufficient rewards : It is too true, however, that among the evils of this life which we form to ourselves, we must reckon this one, that there is no such thing as perfect agreement in sentiments and characters : But, even this ought to make us admire the wisdom of Providence, which, notwithstanding the disunions and disorders of the world, notwithstanding the self-interest which governs mankind, still keeps up society and makes it flourish. When a pilot knows how to direct his ship, so as to avoid the sand-banks against which it may be cast by the waves, it is then that I admire his skill and experience. And when I see, notwithstanding the wickedness of mankind, in the midst of the storms of passion, that wisdom and virtue still preside, I
admire

admire the infinite wisdom of him who governs the world.

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MAY XXX.

THE PRODIGIOUS NUMBER OF PLANTS ON
THE EARTH.

ABOVE twenty thousand different sorts of plants have been already reckoned, and we discover new ones every day. Some have been found out by the help of the microscope, where they were least expected. Mosses and sponges have been classed among vegetables, and have discovered to the virtuosi flowers and seeds before unknown. Freestone is often covered with dark brown spots, and the same is seen on the best polished glass. This mouldy substance sticks to most bodies, and it is a garden in miniature, a field or a forest, where plants have their seeds which blossom visibly, notwithstanding their extreme littleness. If we reflect on the quantity of moss which covers even the hardest stones, and the most barren spots; on the quantity of herbs and grass; on the several sorts of flowers; on all the trees and bushes, each of which may be considered as an assemblage of a thousand different vegetables; if we add to these, the aquatic plants, as slight and delicate as a hair, and most of which are still unknown to us, we may in some measure form to ourselves some idea of the multitude of plants upon our globe. It is more wonderful how all these different sorts of plants are preserved, without destroying one another. In order to prevent this, the sovereign Disposer of all things has appointed to each species of vegetables

getables a place analogous to its peculiar qualities. He has distributed them upon the surface of the earth, with so much wisdom and propriety, that no part of it is destitute, nor do they grow in too much abundance any where. This is the reason that some plants require growing in an open field, and not in the shade, where they would at least grow languid and weak. Others can only subsist in water, where the different qualities of the fluid matter occasion great variety. Some plants grow in sand, others in marshy and muddy places. Certain vegetables spring above the surface of the earth, others unfold themselves within its bosom. The different strata of which the soil is composed, sand, clay, chalk, &c. have each their particular vegetables; and from thence it is, that, in the immense garden of nature, there is no place absolutely barren. From the smallest dust to the hardest rock, from the torrid to the frigid zone, every soil, every climate, has its peculiar plants. Another circumstance is well worthy our admiration; the Creator's having so ordained, that, among this great number of plants, those used for food or medicine increase much more abundantly than those of less use.

Herbs, both in species and individuals, are much more numerous than bushes and trees. There is more herbage than oaks, more cherry trees than apricots, more vines than rose trees. It is evident, that the Creator designed this for the general good. To be convinced of this, let us suppose the contrary had been the case: If there were more oaks than pasture, more trees than herbs and roots, how difficult would it be for animals to subsist, and how many charms would the earth be deprived of!

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All-wise, almighty, and most merciful Being! in this also does thy wondrous providence appear. It requires no effort of the mind to comprehend that thou art great and good; we need only contemplate thee in the immense world of plants.

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MAY XXXI.

PLURALITY OF WORLDS.

IT is not through ignorance alone, it is more through self-love and pride, that we call nothing the world but one of the least parts of the universe; persuading ourselves that our globe alone is peopled; that the sun was made merely to communicate its light and heat to us; and that the moon and stars are of no other use but to light our nights, and shew the traveller his way. The contemplation of the fixed stars is sufficient to contradict this ridiculous opinion. Their twinkling proves, that they shine with their own light; and their being visible to us, at the immense distance they are from us, proves that they are much larger than the sun. Is it then probable that these celestial bodies, which are not luminous specks, but great suns; these numberless bodies placed so far from our globe, that they should not be created for better purposes? If the purpose of them were only to serve as nocturnal lights to us, they would be of no use the greatest part of the year. The frequent cloudy skies, and the nights that are light from other causes, would make them useless. Those stars also, which the naked eye cannot discover, from their great distance, would be absolutely of no use; and the purpose

ascribed to them would be better supplied by one single star nearer to us, than by so many millions at that distance. As the same reasoning may be applied to all the uses the stars are of to us, either in navigation or any thing else, it must be allowed, that we could not possibly account for the design of those numerous suns, if no creatures except those of our own globe profited by their light and heat. This conclusion appears still more natural, if we reflect attentively on our solar system. We have already observed, that the moon in many things resembles this earth; that there, as well as here, land and sea, mountains and valleys, islands and gulphs, are to be seen. Such affinities as these authorise us to admit others, and to suppose also in the moon, minerals, plants, animals, and rational creatures. The analogy between the moon and the rest of the planets leads us to form the same conjectures of them. And as each star has, to all appearance, like our sun, its particular planets, and as these undoubtedly resemble ours, we, in a manner, behold around us an innumerable multitude of worlds, each of which has its peculiar laws, arrangement, productions, and inhabitants. How numerous are the works of God! How glorious the starry sky! How great our Creator! Millions of worlds declare his glory, and the intelligent beings they contain acknowledge and adore their Maker. How forcibly does this incline us to join with the heavenly choir, in singing the praise of the Most High, that it may resound over all the universe! How happy the prospect that opens to us of that future state, wherein we shall be acquainted with these worlds, and able to comprehend the wonders of them! How great will be our astonishment in discovering objects quite

JUNE I.

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quite new to us, or at least very imperfectly known ! In what splendour will the divine perfections appear, the power of which extends over a multitude of worlds, while we falsely imagine it reaches only to the little globe we inhabit ! What an inexhaustible fund of varied knowledge ! What endless subjects for glorifying the Creator and Ruler of all these worlds !

JUNE I.

DIFFERENCE BETWEEN THE WORKS OF NATURE
AND THOSE OF ART.

WHEN we compare the works of nature with those of art, we find that the former has great superiority over the latter. The consideration alone, that the productions of art are only imitations of nature, is enough to prove this truth beyond a doubt. What artist is there that does not wish to come as near to nature as possible ! He is not able to invent, and all he does must have been taught him by nature. How rich and what variety is there in it ? and, on the contrary, how poor and dull is art ? In the vast kingdom of nature we find an inexhaustible treasure ; and any one of its parts, a stone, a plant, an animal, affords us so many objects worthy of admiration, that, in examining them with the utmost exactness, even to the smallest particle, we cannot discover the slightest imperfection in them. The works of art, on the contrary, are soon exhausted : If they are searched to the bottom, and strictly examined, one soon loses the admiration they at first excited, and discovers faults and imperfec-

tions not thought of before. What are the most perfect statues in comparison of a single animal, an insect, a worm? Nature is able of herself, to produce the greatest master-pieces; whereas art borrows from it all that it has of the beautiful. It has nothing of its own; and nature has the first right over every thing. Let us add to this, how much less durable the works of art are, than those of nature! When the former have been long destroyed, the others still subsist in all their primitive beauty. How superior is the interior construction of the productions of nature to all the works of men! Compare, for example, the most ingenious machine to the mechanism of animals, and you will be struck with admiration at the sight of the miracles of nature, whilst the masterpiece of art will appear a mere bauble. Let us only consider ourselves with attention. The perfect and regular construction of our muscles and arteries; the wonderful circulation of the blood in our veins; the variety and number of movements in our limbs; what proofs of the magnificence of God's works! and how poor and trifling, in comparison, are the productions of man! It would be easy to pursue these remarks, if what has been said was not more than sufficient, to teach us the just value of the works of nature. It is true, that self-love carries us so far, that we are but too apt to prefer our own works to all others; and our taste is so depraved, that we look on every thing with disdain and indifference, in which the industry of man has no share. Both these prove our ignorance and ingratitude. Can we be so unjust, as to set less value on a watch, admirably finished by a great artist, than on a ball of snow, made up by a child? In thus robbing the ingenious workman of the honour due to him,

him, should we not prove at the same time our ignorance and folly? That is exactly our case, when we do not properly distinguish between the works of nature and those of art. It is true, that we ought not to despise the productions of art, for they also have their value; but, on the other hand, it would be absurd to consider them as equal, and still more so, to prefer them to the works of nature. God made his works so perfect, that through them we might acknowledge his power, wisdom, and goodness. Let us fulfil this great duty, and never give up the contemplation of nature, nor forget the effect such researches ought to have upon us. Let the study of nature be our delight, because it will teach us more and more to know the Creator and Ruler of the world, and will continually excite in us a desire to arrive one day at a perfect knowledge of his works.

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JUNE II.

LEAVES OF TREES.

THE leaves of trees form one of the great beauties of nature. Our impatience to see them bud in spring, and our joy when they at last appear, prove sufficiently that they are the ornaments of our gardens, fields, and woods. How great the pleasure we enjoy in the hot summer days from the refreshing coolness of their delightful shade. Yet, after all, this is certainly the least of the advantages which accrue to us from the foliage of trees: We need only consider the wonderful construction of leaves, to be convinced that they were designed for much more important purposes. Each leaf

has certain vessels, which, being pressed close at the end, or in the stalk, extend themselves like ribs within the leaf, and branch out in a thousand ways. There are no leaves without extreme fine vessels, and an astonishing number of pores. For example, it has been observed, that in a sort of box-tree, called *Palma cereris*, there are above an hundred and seventy-two thousand pores on one single side of the leaf. In the open air, the leaves turn their upper side towards the sky, and the under towards the earth, or towards the inside of the plant. To what purpose would this particular arrangement of the leaves be, if they were of no other use but to adorn trees, and to procure us shade? Most certainly the Creator had something much more important in view. The nourishment of plants proceeds directly from the leaves: their pores serve to suck in the moisture or the juices of the atmosphere, and to communicate them afterwards to the whole plant. What wisdom is there in this organization! By these means the plants in dry weather run no risk of wanting nourishment. They receive abundance of refreshing dew, which, falling from the upper leaves, waters those under them, and thus none of this nourishing juice is lost. And as plants perspire greatly, as many experiments shew us, the leaves appear to be the principal organs of this important perspiration. They serve also to introduce into the plant the air it requires. They appear even to contribute to the preservation of the bud which is to shoot the following year: for the eye of the bud is already under the leaf: Undoubtedly it is guarded and preserved by them, at the same time that the quantity of juice, where the leaf joins to the plant, also serves to preserve it. This is the reason, that many trees wither and die

die when their leaves are gathered. It sometimes happens to the mulberry tree, when it is stripped without proper caution to feed silk worms. This is also the reason that grapes do not ripen, when the vine loses its leaves in summer. Another remark may be made on this subject, which very much opens to us the manner of the plant's growth: The under side of the leaves, always turned towards the ground, is generally of a paler and less bright colour; it is more rough and spongy than the upper side. Here again we discover the wisest purposes: The side of the leaf next the ground is rougher, and consequently more full of pores, in order to suck in so much the better what dew rises from the earth, and to distribute it afterwards over the rest of the plant in more abundance. The leaves then turn on the side that can best receive the nutritive moisture: and this is the reason that the leaves of some plants incline very low down. If we observe trees growing on a steep hill, we shall see that their leaves do not take a horizontal direction, but evidently a perpendicular one; which proves that the leaves draw towards the side where there is most moisture. These reflections may make us consider the leaves of the trees hereafter, in a different light from what we have hitherto done. If we did not know the inimitable art of their construction, nor the important purpose of their existence, it would not be wonderful, that we should see them with neglect and indifference. But when we know that each leaf is an effect of the Divine Power, and an organ of fruitfulness, it would be unpardonable to see them with inattention. They ought naturally to lead us to the following useful reflections: Every thing, even the very smallest object in nature, has been planned with wisdom by the Crea-

tor. There is not a single leaf that is a mere ornament, and of no use. It contributes its share towards the fertility and support of the vegetable kingdom. If each leaf then is a work of Divine Power, what a multitude of wonders does not a single tree present to us? The faculties of our minds cannot reach to the bottom of one only, and the smallest leaf might afford subject for reflection all our lives.

JUNE III.

THE REVIVING POWER OF THE SUN.

I MYSELF feel this beneficent power. As soon as the sun rises over my head, it fills my soul with serenity and joy. Its splendour and warmth inspire me with spirit and activity, sufficient to fulfil the duties of life and to enjoy society. The involuntary indolence and lowness, which made me inactive in winter, are by degrees vanished. I breathe more freely, and I employ myself with more pleasure. How can it be otherwise, when I am witness to the universal joy which the sun communicates to the world, and every where perceive its enlivening powers? It animates and revives all creatures with its benign influence. Millions of shining insects awake, sport, and bask in its rays. The birds salute it with their melody. Every thing that breathes rejoices in it, and we every where trace its happy effects. It causes the sap to rise and circulate through trees, plants, and vegetables. It causes the leaves and blossoms to shoot. It forms the fruit, then ripens it, and gives it colour. It sheds life and light throughout all nature. It is the source of that warmth, without

out which every animal would languish and die. The effect of the sun is not only felt on the surface of our globe, but even in caves under ground where it produces metals, and also animates living creatures. It penetrates into the highest mountains, though they are composed of rocks and stones. It extends even to the bottom of the ocean, where it acts in several ways. When we reflect on these useful effects of the sun, it is natural to think of the miserable condition we should be in, if we were deprived of the light and heat of that celestial body. Without it, what would our globe be, but a lifeless mass, without order or beauty? The trees could not produce leaves, nor the plants flowers; the fields would be without verdure, and the country without harvest; all nature would have a gloomy, melancholy appearance.

The sun, with its reviving power, is the emblem of a truly charitable Christian. He also spreads joy and blessings around him. By him the oppressed heart is raised and strengthened, the afflicted are comforted, the ignorant are enlightened, and the poor relieved. Oh! let us hereafter resemble this beneficent and charitable man. Let us, according to our different stations, share with our fellow-creatures the goods which Providence has bestowed upon us. Without partiality or prejudice, let us hold out assistance to all who want it. Let us instruct one, comfort another, feed this one, relieve that one. Thus shall we quit this world regretted and beloved, and our memories be blessed by our fellow-creatures.

JUNE IV.

THE DESIRES OF THE SOUL ARE
INFINITE.

LET us employ some moments in reflecting on ourselves. The soul has certainly the first claim to our attention. It touches us nearly, and ought to be dearer to us than all the pleasing objects which this season so particularly affords. Whatever satisfaction we find in contemplating the corporeal world, it cannot be compared to that which we experience, in reflecting upon the nature and faculties of the soul. The observation of exterior objects, such as the traveller meets on the road, is certainly agreeable to him, because he requires to be amused and refreshed through his pilgrimage; but that of spiritual objects leads directly to the blessed immortality we may expect as citizens of the world to come. Let us therefore sometimes reflect on the desires implanted in our souls by the Creator. Experience proves, that our thirst of knowledge can never be fully gratified. We have no sooner made one discovery than we aim at another. Our desires are never satisfied; and when we at last obtain what we had most ardently wished for, we begin again to form new desires: That of acquiring more and more blessings accompanies us through life, and even in the moment of quitting the world. What conclusion can be drawn from this, but that, as our desires continually extend beyond the present, without being ever fully gratified, there must be blessings after death, beyond the limits of this life? We are not then designed for this transient life alone, but for an everlasting one. Is it probable, indeed, that
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man would be the only creature on earth endowed with faculties, without having, at the same time, the destiny for which these faculties were bestowed upon him? That man should have an instinct, without the means of satisfying it, and be in this respect more miserable than brutes? When a beast is hungry or dry, it always finds means to supply its wants. We see the silkworm spin its bag, and shut itself up for its transformation. Would that happen if it was not designed for another state in which it was to appear again under a new form? We see that birds lay eggs: Would that be the case, if these eggs were not to serve for the preservation of their species, or that of other creatures? If our existence, then, was to be confined within the narrow limits of this life, why should we have received inclinations and desires which cannot be gratified, and faculties which we could never use? No, certainly, our heavenly Father has not implanted endless desires in our souls to no purpose, much less to be a torment to us.

Being of beings! Our souls are capable of being filled with thy Spirit; we may love thee above all things; we may aspire at being like thee, and united to thee for ever; we may be raised in this world above all earthly things, and soar even to thee. Is it then possible, that souls such as these should be annihilated? that we should have learned to know thee in vain, to love thee, and to aspire to thy blessed fellowship in vain? For we are far from enjoying it here: We know thee but in part: our love is yet faint and weak; and we but imperfectly enjoy thy grace. Undoubtedly, whatever we possess on earth are but pledges and fore-runners of the infinite felicity which awaits us hereafter.

This explains, this reconciles every thing ; and we may clearly see in this our future destiny. We see it is not in vain that we wish continually to increase in wisdom and virtue, and to draw nearer unto God, the source, the origin, and model of all perfection. We see that the happiness we cannot enjoy here, or at least but for a short time, we shall possess to all eternity in a future state. We may now assure ourselves, that the delightful hours, in which the love of God has filled our hearts, and in which we have had a fore-taste of heavenly joys, are not fruitless, or to no end. If we aim at perfection, we shall obtain it. No propensity, no desire, no faculty of the soul, was given in vain. They will all be fully gratified and employed in a blessed eternity. Let us therefore rejoice in the immortality of our souls, God himself has given us the sense of eternity.—Let us not then dwell on visible, but on invisible things. In the midst of all the pleasures we here enjoy, of all our flattering hopes, and the good we possess, let us aspire to those pleasures, those hopes, those unspeakable blessings, which are reserved for us in a better state. Let us employ the noble faculties of the soul in raising us to heaven, for which purpose they were properly designed. Let us preserve our souls, which were created and redeemed for immortality, from the seduction of the senses, that they may not be absorbed in trifling pleasures unworthy of them.

JUNE

THE USE OF RIVERS.

WHEN we calculate the space which the rivers take up in our globe, we find they deprive us of great part of the continent. Some are discontented at this, and fancy it would be better to have had less of rivers, and more of land. But if they would only consider, with what wisdom, and in what due proportion the Creator has planned every thing upon our globe, they would conclude, that rivers have not been spread over the earth without good reason and essential use to men and other creatures. It must be observed, in the first place, that the water of rivers affords a very wholesome drink to man. Spring or pump water, when it has been long without motion, under the ground, loosens, and insensibly carries away with it some particles which may be hurtful; but river water, which is continually evaporating, and always in motion, is purified from all dirt, and, by this means, becomes the most salubrious drink for men or beasts. However, the use of rivers extends still farther. Is it not to them we owe the neatness, the wholesomeness, and comfort of our houses, as well as the fertility of our fields? Our habitations are always unhealthy, when they are surrounded by stagnant water, and by marshes, or when the want of water occasions a hurtful drought. The smallest rivulet cools the air around it, and makes it extremely agreeable. It is the same in respect to the fertility of the land; it is generally owing to the neighbourhood of rivers. What astonishing difference between a country water-

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ed with rivulets, and one to which nature has denied this assistance ! One is a barren dry desert ; the other, on the contrary, is in some sort a garden of delights, where woods and valleys, meadows and fields, present a thousand beauties, and the most pleasing variety. A river, winding through it, makes all the difference between the two countries : It every where conveys health, prosperity, and plenty. It not only waters the country, in moistening the roots of plants, but it also makes the earth fruitful by its constant evaporations and inundations. Who can be so inattentive, or rather so ungrateful, as not to acknowledge how useful rivers are to whole countries and provinces, when we daily draw such numberless advantages from them ? How could commerce be so conveniently carried on, if we could not, by means of rivers, obtain from the most distant nations, the merchandise and goods we require ? How many machines and mills should we be deprived of, if they were not put in motion by rivers ? How many kinds of delicate fish should we want, if rivers did not furnish us with abundance of them ? But, say they, if there were no rivers, we should escape those inundations which sometimes do so much mischief. I allow, that when rivers overflow their banks, they may make great havock and devastation in flat countries. But, is this inconvenience sufficient to prevent rivers from being a blessing of Providence ? Do not the numberless advantages which accrue from them, much exceed the harm they sometimes do ? Inundations seldom happen, and they extend over very little country. Besides, whatever destruction they occasion by overflowing lands, there still results much good from them. For the very inundations manure
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and enrich the ground ; and to an attentive observer, they are a proof, that God blesses with one hand, while he appears to chastise with the other. Thus, then, the rivers ought to convince us of that divine goodness which is over all the earth. We see that all parts of nature, and all the elements combine to make us happy, and to procure us a thousand conveniences. If only one of the blessings of God failed us, its privation would destroy much of our happiness. If there were no rivers there would be no fertility, and the earth would be but a barren heap of sand. What shoals, what innumerable multitudes of creatures, who can neither live in the air nor on land, would suddenly perish, if the Almighty Hand, which created rivers, was to dry them up !

JUNE VI.

THE VARIETY OF FLOWERS.

WE cannot be but struck with astonishment, when we consider the prodigious number of flowers which are produced in spring, summer, and autumn. But the variety among this numerous host is perhaps still more surprising. Certainly nothing but a Divine Power could cause such numbers to grow ; while this power must have been united with wisdom equally great, to produce such infinite variety. If they had all been perfectly alike, the sameness would have fatigued the senses ; and if summer produced no fruit or flowers, but such as spring affords, they would give us no pleasure, and we should soon tire of the cultivation they require. It is consequently

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an effect of divine goodness, to have varied the vegetable productions so agreeably; and to have added that charm to their other perfections.— This variety does not only extend to whole tribes of plants, but to the individuals also: The carnation differs from the rose, the rose from the tulip, the tulip from the auricula, and the auricula from the lily. But each carnation, rose, &c. has also its own particular beauty and character. Each has something peculiar to itself. There are not two flowers of the same species perfectly alike in form and shades. Take a view of a bed of flowers in a parterre: There you may behold some of a great height, that seem to soar above the rest; some of a middling rank, some that bear their stately heads above the height of man, others that creep upon the ground; some that dazzle with their rich colours, others that are simple and make no show; some perfume the air with exquisite odours, whilst others only please the sight with their beautiful colours.— The flowers no less vary with respect to their seasons: In spring, when men leave the cities in order to go and view the productions which a bountiful Creator grants for their subsistence, they then see the blossoms in full bloom and beauty. Towards summer a thousand and a thousand flowers present themselves to the sight, and form a beautiful scene. They succeed one another regularly, and in the order designed. When winter at last arrives, it brings other plants with it; which, though they may not please the eye, have their uses nevertheless. And if we go through the race of vegetables, we shall still find more and more varieties of them. What a difference! How many degrees between the grass which grows amongst the stones, and that
useful.

useful plant, to which we are indebted for the most wholesome food, and that which we can the least dispense with ! Amongst the creeping winding plants, what difference between the weak ivy and the vine, whose grapes afford us such delicious drink ! Amongst the trees, what a difference between the wild plumb-tree and the oak !

Lord God ! With what wisdom hast thou planned all thy works ! This is the most natural conclusion to be drawn from these reflections. With what wisdom the whole plan of the vegetable kingdom is formed, and how perfectly executed ! In all his works the useful and the agreeable are joined. For, is it not to procure us pleasures, equally varied and inexhaustible, that there is such astonishing variety amongst the plants ? There is not a month of the year that is not marked with his blessings. Each of them affords new pleasures to our senses, and new proofs to our hearts of his tender mercies.

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JUNE VII.

THE USE OF VENOMOUS PLANTS AND
ANIMALS.

EVERY thing on earth, considered separately, is good and wholesome ; and, if any thing becomes hurtful, it is because we make a bad use of it, instead of that for which it was designed. From thence it is, that a sort of food, which preserves the life of one animal, destroys another ; and that a plant, which, in some cases, is considered as poisonous, is, on other occasions, very useful and salutary. Thus, for example, hemlock was formerly

merly supposed deadly poison, and now a number of experiments assure us, it makes admirable cures. The multitude and variety of vegetables which grow upon the earth is prodigious; but we must not imagine they were all created for the use of man. Some plants are designed for beasts, others furnish us with dress and ornaments; some please our taste and smell, and a great number of them are medicinal, and would be of great use in many maladies which men and animals are subject to, if they did not mix bad ingredients with them. The same thing may be said of many living creatures, which, though very dangerous to us, are very useful to other animals, either as food or medicine. Most birds make their chief food of insects, commonly thought hurtful. Domestic birds eagerly swallow spiders. Peacocks and swans delight in all sorts of snakes. If we also consider how many excellent medicines are composed of the most poisonous herbs, nothing can be more easy than to justify the wisdom and goodness of God in forming creatures useful to us in so many ways. The following reflections will more and more convince us of it. The number of noxious plants and animals is nothing in comparison of the multitude of those that are of the greatest use to us. The Creator has also implanted a natural instinct in men and animals, which gives them an aversion for whatever is hurtful to them. The mischievous beasts have a certain fear of man, and scarce ever make use of their offensive arms, unless they are attacked or provoked. Besides, the most noxious animals have evident marks and characters, by which their dangerous properties are easily known; that, by being warned, we may avoid, or prevent the danger. The rattle-snake, which
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is the most venomous of all snakes, gives warning of its approach by the clattering of the rings in its tail. The crocodile is so heavy in its motions, and turns with such difficulty, that it is very easy to escape from it. Divine Goodness has even so wisely disposed things, that the most dangerous and venomous animals furnish the remedy with the poison. Thus the scorpion oil is an infallible remedy for its sting. A bee bruised, rubbed, and put on the wound, cures the evil it did. The fat of vipers is also an excellent remedy against their bite. It might be said, perhaps, that it would be better if there was no plant or animal that could hurt other creatures. But this would only prove our ignorance and self-love. If God has ordained, that one creature should hurt another, it is for very wise purposes; and from this plan, there accrue to us many very great advantages. Several creatures which appear hurtful, are not really so, at least, in certain respects. Their poison, and even the organs they make use of to wound others, are absolutely necessary to them. One example may serve for all the rest; The bee often gives pain with its sting, but if it is taken from it, the bee can never be of any use afterwards. It is the same throughout all nature. Every thing that appears hurtful is, in reality, indispensibly necessary. Wherefore, then, has man the presumption to decide what is hurtful or useful in nature? Who can say it is contrary to the wisdom of God that we should sometimes feel pain? Do not the most disagreeable things often procure us the greatest advantage? In general, it is certain, that natural things are only hurtful by accident; and if we receive harm from them, we may always blame our own imprudence.

JUNE VIII.

THE PERFUME OF FLOWERS.

A THOUSAND pleasing and cheerful objects surround me on all sides. Every thing I see, every thing I hear, all the sensations which smell or taste can give, all contribute to my enjoyment or happiness. Every thing in nature, at this beautiful season, seems combined to fill my mind with the sweetest and purest delights, and to lead my heart towards God. Every object that excites my admiration, inclines me to look up to him as the source and giver of all that we enjoy. Each flower is a proof of his power, a mark of his existence, and a hymn to his praise. I will, at present, confine myself to the pleasure I receive from the variety of sweet perfumes which the flowers afford. It would have pleased the eye alone with the wonderful variety in the vegetable kingdom, but he has graciously added, to the other charms of flowers, that of sweet perfumes; and there is as much variety in their smell as in the flowers themselves. Though we cannot exactly determine in what the difference consists, we perceive it sensibly in going from one flower to another. It is also remarkable, that the smell is neither strong enough to hurt the head, nor weak enough to lose its pleasing effect. The particles which the flowers exhale are so light and fine, that they disperse to a distance, and thus are not troublesome. A grain of amber can fill a whole room twenty feet square and fifteen high with its perfume. The smell of the rosemary, that grows in Provence, reaches twenty miles beyond sea.

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But how is it that the vapours which exhale from plants so easily reach the organs of smell ! It must be attributed to the construction of the nose. It is composed of two cavities, separated by a partition. They unite by degrees, and end in one only which reaches to the bottom of the throat, where there is a communication with the mouth. All this cavity is lined with a membrane, which is one continued series of nerves. These come from the brain, through a bone pierced full of holes, which, on this account, is called the sieve-like bone. The smelling channel being wide at the bottom and growing gradually more narrow towards the top, occasions the smelling corpuscles to accumulate in the upper part, when we breathe the air through the nose ; and, of course, must affect those nerves the more. By these means we receive the impression of even the least smell. Let us also observe, that Divine Wisdom has formed bony plates, which stop the upper part of the nose, and which have a two-fold use. They prevent any thing hurtful from entering into the breathing passage during sleep, or when we are unable to guard it otherwise.— They receive and support the branchings of the olfactory nerves, a great number of whose little branches and threads are dispersed in these bones ; and, by that means, these nerves meet every where the odoriferous corpuscles, which strike them when they enter the nose with the air.

It is therefore very just, O Lord ! that we should bless and give thee thanks for those wise plans. For, that the smell is a real blessing, we must particularly be sensible of at this season.

JUNE IX.

THE MULTITUDE OF ANIMALS.

THE naturalists, who have calculated the number of animals on our globe, have discovered about 400,000 species. However prodigious this number may appear, it is by no means exaggerated. There is reason to suppose, that, in the known parts of the earth, there are more than 450 kinds of land animals, 600 of birds, more than 2000 of finny fish, more than 3000 of shell fish, more than 20,000 different sorts of insects, visible to the naked eye. In this number, the insects which belong to different sorts of animals are not comprised, and which, at least, amount to 100,000 species. There is also an infinity of insects still unknown to us; we may presume above 200,000 sorts. And what shall we say to the innumerable multitude of insects which feed on plants only? 18,000 species of plants have been reckoned. In giving, then, but four species of insects to each, we find that this amounts to 72,000. Such a number of animals living on our globe certainly appears prodigious; but it will not be found too much, if we believe, with some naturalists, that every part of the immense kingdom of nature is animated, and filled with live creatures. Very skilful physicians maintain, that the disorders which are attended with blotches and pimples, and even certain fevers, are occasioned by worms. It is also very probable, that the atmosphere is sometimes peopled with animals, although their extreme minuteness prevents them from being visible. Who knows whether that sort of trembling motion seen in the air during summer, may not be produced by millions of insects swarming

swarming in the atmosphere? Let us take the first flower that falls in the way, for example, a daisy, or a rose, and we shall find there a multitude of insects. Is there the smallest spot in nature where living animals are not to be found? Nature has even produced animals in other animals, and made one animal to be as a world for other creatures to subsist in. The air, the juices of animals and plants, corrupted matter, excrements, smoke, dry wood, and even the hardest stones, in some measure, feed and serve to lodge living creatures. The sea seems an element made up of animals. That light observed upon it in summer nights, is owing to innumerable little shining worms, whose parts, when divided from the body and corrupted, still shine, as the worm itself did when alive. Whole swarms of animalculæ, which the eye cannot reckon, flutter and sport in the rays of the sun. All these innumerable animals of our little globe are infinitely diversified in their form, their organs, their faculties, and motions. Undertake, O man! to name all these animals, to express by numbers the individuals of one single species; to calculate how many flies, worms, birds, &c. there are! How could you do it? Their number is unknown, and if it were not so, it would be impossible to express it by cyphers. Here we have a fine subject for admiration, in reflecting on the infinite power of our Creator. He alone produced, he alone preserves and supports this immense multitude of creatures. Consider how much food such a number of animals require. If they only lived at each others expence, if they destroyed one another, nature would present us with nothing but a frightful scene of murder and slaughter. But happily there are not many carnivorous animals; and they are very useful in devouring carcasses, and by that means

means guarding us from infection, as well as in preserving a certain balance, by preventing any species from multiplying too fast. Besides this, the Creator has properly designed the vegetable kingdom for the food of animals; and he has assigned, to almost each species of beasts, a particular kind of plant. In order that all sorts of animals should have food in proportion to their number, he has ordained that they should live in different countries of the earth. How exactly has he even measured the ground! One single tree is larger than thousands of plants; yet it fills up no more space on the surface of the earth, than a few feet square, and a multitude of quadrupeds, birds, and insects, find their food there, and lodge in it. What care also has the Creator shewn, in surrounding all animals with a fluid matter adapted to their different natures. Two sorts of seas are destined for them; one of water, and one of air. All living creatures are in one or other of these two elements, except the small number which can live in either. The bottom of these two seas is the habitation of a part of those animals; such as are, in the upper sea, the reptiles, and most of the quadrupeds; and in the lower sea, the zoophytes, the shell-fish, corals, oysters, &c. Others have the power of rising and descending as they please in their element, as the birds and insects do in the air, and as the whales and most other fish do in the water.

And the Atheist dares to say in his heart, that there is no God! Senseless man: "Go and ask
"the beasts, and they shall teach thee; and the
"fowls of the air, and they shall tell thee; or
"speak to the earth, and it shall teach thee, and
"the fishes of the sea shall declare unto thee.

"Who

“ Who knoweth not in all these, that the hand
“ of the Lord hath wrought this ?”

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JUNE X.

IMMENSITY OF THE FIRMAMENT.

COME, O man, and contemplate the firmament ! behold that multitude of lights which shine and illumine your nights. Try to count them ; but thy weak sight is unable to do it ; and thine eyes are lost in the numberless stars. Well, then, take thy telescope, and double thy sight. What dost thou now see ? To the first million new millions of worlds are added. Continue these observations, and undertake to count the stars thou hast discovered. Thy ideas are confounded. Thou seest that it is beyond the power of numbers to express such immense multitudes. It is true, that for many ages past, mankind have tried to find out the number of the stars ; but the discoveries made in the heavens since the invention of telescopes, plainly prove, that no man can ascertain the number of celestial bodies. One of the most ancient astronomers reckoned but one thousand and twenty-six ; the catalogue was afterwards increased to one thousand and eighty-eight stars. But the observations made since, by the assistance of telescopes, have convinced mankind, that the human sight cannot discover all the celestial bodies. Our instruments have informed us, that the long, white, and luminous tract, which fills a large part of the sky, called the Milky Way, is composed of a multitude of stars. We know even that, in places where we saw with the naked eye but one

single star, the telescopes have since discovered many more to us. By their means, we distinguish, in two constellations alone, twice as many stars as we reckoned in the whole sky. How much has this of course enlarged our ideas in respect to the greatness of the universe! But if the discoveries already made have so increased our admiration of the immensity of the Divine Power, it will rise still higher when we reflect how vast these bodies must be, which, notwithstanding their prodigious distance from us, are many of them visible to the naked sight. Exact calculations, which may be depended on, inform us that a cannon ball would take more than seven hundred thousand years to reach from hence to the nearest of the fixed stars; and yet the greatest astronomers agree, that these numbers are not sufficient to express even the apparent distance of a fixed star. Some of these globes appear to us to be the largest, because they are the nearest to us: They are, on that account, called stars of the first magnitude. Those nearest to them are called stars of the second magnitude, because being much farther from us they appear smaller. They must be at as great a distance from the former, as the latter are from us. Those of the third magnitude must be three; those of the fourth, four times farther from us than the first, &c. Supposing there were but twenty of these, it would follow, that the diameter of the whole universe, if there were only twenty classes of stars, would be so great, that a cannon ball could not go through it in twenty-four millions of years.

King of heaven! Sovereign Ruler of the stars!
Father of spirits and of men! O that my ideas
were vast and sublime as the expanse of the heavens,
that I might worthily meditate upon thy
greatness

greatness ! That I might raise them even to these innumerable worlds, where thou displayest thy magnificence still more than on this earthly globe. That as I now pass from flower to flower, I might go from star to star, till I arrived at the august sanctuary where thou sittest on the throne of thy glory ! But my desires are vain, as long as I am a sojourner upon earth. I shall not know the wonders of the celestial globes, till my soul is delivered from the incumbrance of this gross body. In the mean time, as long as I live in this world, I will raise my voice, and sing thy praise.



JUNE XI.

SINGULARITIES IN THE VEGETABLE KINGDOM.

THE variety of animals is so great, that it appears at first difficult to find connection between them and plants. Some beasts live only in water; others only on land, or in the air; some which can live in either or both equally. But it may be said literally, that it is the same in respect to vegetables. There are plants which only live in the ground; others that only grow in water; others that can bear no moisture; others, still, which live equally in land or water: There are even some that live in the air. There is in the island of Japan a tree, which, contrary to the nature of all other plants which require moisture, cannot bear it. As soon as it is wet, it withers, and the only way to save it from dying, is to cut it down to the root, to dry it in the sun, and afterwards plant it in a dry and sandy soil. It is known, that a sort of mushroom, moss, and other little plants, swim in the air: But a more extraordi-

nary thing is, that a sprig of rosemary, which was put into the hand of a dead person (according to the custom of some countries), took root so well to the right and to the left, that at the end of some years, when the grave was opened, it had covered all the face of the corpse with its leaves. The vegetation of the truffle is still more singular. This extraordinary tubercle has neither roots, nor stalk, nor leaves, nor blossom, nor even any visible seed: It draws its sustenance through the pores of its bark. But how it is produced, or why, in general, there should be no other herb where those sort of mushrooms grow, and the earth be light and full of crevices, has not yet been accounted for. There is no plant which can better be compared to the land and water animals, than that sort of membranous moss called *nostock*. It is an irregular body, a little transparent, and of a pale green colour. It trembles when touched, and is easily broken. It can only be seen after it has rained; it is then found in several places, but chiefly in uncultivated ground, and along the sides of sandy roads. It is formed also in a moment; for when in summer, walking in a garden, not the least trace of it is seen; on a sudden a storm of rain falls, and in an hour after, in the same spot, the whole walk will appear covered with a great quantity of it. For a long time it was supposed that the *nostock* fell from the sky; but it is now known to be nothing but a leaf, which draws the water greatly, and sucks it in. This leaf, to which no root has been discovered, is in its natural state when it is well impregnated with water; but heat, or a high wind, makes the water evaporate in a few hours, and then the leaf contracts, shrinks, and loses its transparency and colour. From this circumstance

circumstance it appears to grow so suddenly, and to be created in a wonderful manner with the rain; as a fresh shower falling on it, when it is withered and invisible, revives and makes it again appear. But there are still more singularities worth observation among the vegetables. The whole atmosphere is filled with millions of invisible plants and seeds. Even seeds of a larger sort are scattered by the wind all over the earth; and as soon as the air has carried them to the places where they can thrive, they become plants; and it requires so little for that purpose, that it is difficult to conceive whence they can draw what is necessary for their growth. There are considerable plants, and even trees, that take root and grow in crevices of rocks, without the least earth. Vegetation is sometimes formed inconceivably quick: For example, mushrooms, and water-cresses, if the seed of them is put into wet linen, become a sallad in 24 hours. There are plants which appear to have scarce any life, and yet they continue to exist. We often see willows not only hollow and decayed within, but the outer bark so hurt, that there scarce remains an eighth part of it. These trunks, however, poor as they are, break out again every spring, and shoot into numberless branches and leaves. How wonderful is it, that the nutritive juice of plants is not only supplied by means of the root, but by the leaves also, which draw it from the air, and, in some degree, pump it in; and that there should be plants, the branches of which become roots, and the roots branches, according as they are turned in planting them! The great age also to which trees arrive, how surprising it is! There are apple-trees, which must be above a thousand years old; and, if we calculate in the gross, the

fruit which such a tree produces every year, we cannot but admire the fertility of a pippin, which can singly supply all Europe with trees and fruit of that sort.

But we should never have done, if we were to pursue these reflections as far as they might lead. Every thing is full of wonders. Every thing marks to us a Being of perfection, whose power, wisdom, and unbounded goodness, all join in heaping upon us continual blessings and enjoyments. Ungrateful as we are, shall we not vouchsafe to reflect on the many wonders that continually surround us ! Can we refuse to bless our God, who does such great and admirable things ! Shall we not sanctify the pleasures which the country and gardens afford us, by contemplating the wonders of the Lord ; by reflecting on them ; by looking from the creature to the Creator ; from the flower to Him who made it.

Lord ! How great and magnificent are thy works ! what wonders present themselves on all sides ! I contemplate them with delight : But I am lost in them. They surpass my comprehension, and I cannot fathom them. It is at thy command that the grass shoots its blade ; that the groves are clothed with verdure ; that the flowers embalm and adorn the fields and gardens with their colours ; that the trees grow and raise their heads to the very clouds. The mountain cedar declares thy glory, and proclaims that thou hast made it. On whatever side I turn, new wonders appear. The country, the vales, and the mountains, the rivers, and the sea, all, from the lowest atom to the highest sphere, is full of the goodness of the Lord !

JUNE

JUNE XII.

MEANS OF HAPPINESS WHICH WE FIND IN
NATURE.

TO be convinced, that, throughout all nature, every thing tends to the benefit of mankind, we need only consider, in the first place, the close connection and relation between all natural things and us. It is true, that there are several bodies, the use of which we do not see relatively to man; but we must not conclude from thence, that we draw no advantage from them. Many things, which appeared useless to our ancestors, do not now appear so; and it is to be presumed, that our descendants will, in their turn, discover what we are at present ignorant of. Let us acknowledge the Divine Wisdom in this. The real use of many creatures is concealed from us, in order to humble our pride, by making us feel how limited our understandings are, and to exercise our minds, and lead us more and more to the contemplation of God's works. Many things in nature are only indirectly useful to us: Several animals serve as food for mankind, and consequently, all that serves as sustenance for them is beneficial to us. The small fish are the food of the larger: many birds feed on worms and insects; and there are several species which live entirely on prey. The Divine Wisdom manifests itself again in this circumstance; for if the fields and productions of the earth were to feed all the animals, there would not be enough left for the use of man: and what would then be the fruit of his labour? I allow that there are several animals which might be said to be

created only to hurt mankind; for example, venomous creatures. Poison is so hurtful to the human body, that it generally causes a painful death; and its effects are sometimes so quick, that there is scarce time to have recourse to antidotes. It is true, that, in this respect, many animals appear in a bad light; but if we consider them on another side, we shall discover traces of God's goodness, and have reason to admire his wisdom. Physicians make use of poison in many excellent medicines. Would mankind have been happier, if there had been no venomous creatures in the world? The poison they have in them had made before a part of those bad vapours which mankind would have breathed, and which would have been prejudicial. In a word, it may be said with certainty, that there is nothing on earth really hurtful to man, unless he makes an improper use of it. But if, in creating our globe, God proposed to himself our happiness, should we not be inexcusable to interrupt his salutary designs, by obstructing our own happiness, instead of labouring for it with all our might? God's views are all merciful towards us, but we often render them useless by a conduct which must necessarily make us unhappy. Let us be wiser hereafter, and make a better use of the many means of happiness with which God so abundantly furnishes us. And if it is not possible to satisfy all our wishes in this world, let us have recourse to religion, which will amply compensate for any defects in nature, and will explain to us many things which appear obscure.

JUNE XIII

THE LOADSTONE.

THE loadstone is the most singular of all minerals in its properties. It is a ferruginous stone of a dark grey colour, and has the virtue of attracting iron. This virtue is not equal throughout the whole stone, but resides chiefly in two of its points, called the poles of the loadstone. When this stone is suspended by a string, and unconfined, it constantly points one of its poles to the north, and the other to the south, if first put in motion, and then left to itself. This regular direction, which only varies a little in some particular parts of the earth, has given the name of the northern pole to that which points to the north, and southern to that which points to the south. The two properties of attracting iron, and pointing toward the north, are communicated to iron by rubbing it against the loadstone. This discovery introduced the magnetic needle, so indispensibly necessary to navigators in long voyages ; which proves, that things may become very useful to the world, though at first sight they appear of little importance ; and that, in general, the knowledge and study of the magnificent works of the creation is of infinite advantage to the human mind. These virtues in the loadstone prompted the naturalists to examine farther into it, with the hope, not only of finding out the cause of such surprising effects, but of discovering new properties in the stone. They were more fortunate in the latter than in the former. It was observed, that the loadstone does not at all times, and in all places, point to

the north ; but that, it sometimes inclines a little to the east, sometimes to the west, sometimes more, and sometimes less. It was observed that its attractive powers were equally strong, though bodies were placed between the iron and the stone, which might be supposed to prevent the effect. Glass, fire, water, men, and animals, with every metal, except iron, give free passage to the magnetic effluvia. It was discovered, that, in two loadstones, the two poles of the same name, the two northern and two southern poles, repulsed each other, and seemed to fly one from the other. It was therefore concluded, that the power of attraction might be in the iron, as well as in the loadstone, as they seemed to attract each other equally. In order to be convinced of this, one need only hang a loadstone on one end of the beam of a balance, and put an equal weight at the other end, and when the loadstone is balanced, and not in motion, to place a bit of iron under it: The loadstone will be immediately drawn down by the iron, and the other weight will fly up. If there situation is reversed, the loadstone will attract the iron in the same manner.

However singular these things are in the loadstone, there is another circumstance no less worthy of observation ; which is, that all the endeavours, and all the sagacity of philosophers, who have taken such pains to discover the cause of these wonderful effects, have been hitherto fruitless. The loadstone is still a mystery to the human understanding. Ought we then to be surprised that, in religion, which is infinitely raised above all that can affect the senses, we should find mysteries we cannot penetrate, and the perfect knowledge of which is reserved for the future state ? Is it surprising, that some things in religion should

should be incomprehensible to us, when in natural things, which we see with our eyes, and feel with our hands, there are so many objects which oblige the most distinguished men of learning to acknowledge their ignorance, and the weakness of their understanding. There are, however, mad people, rash enough to doubt, and even to deny, whatever they cannot comprehend in religion. If this consequence was right, we might with much more reason say, that the loadstone does not attract iron, or point to the north, and that all is false that is said of it, because we can neither explain nor comprehend it. When natural things are in question, one may say to such sceptics, Come and see. But the mysteries of religion are not seen with the eyes of the body. The mind alone perceives them, and will understand them perfectly when admitted into the kingdom of light. Let us wait for this happy period, and if we find any thing obscure and inexplicable in religion and in nature, let us remember, that the imperfect state of our souls and bodies prevent us from searching to the bottom of them. Let us remember, that a considerable part of the happiness of the world to come will consist in having a more perfect knowledge of all that can contribute to complete our felicity, and to prove the glorious attributes of the Being of beings.

JUNE XIV.

CHERRIES.

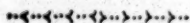
CHERRIES are a fruit, which, from their sweetness, mixed with a pleasing acidity, quench

the thirst, allay the fever of the blood in the heat of summer, and prevent the bad humours to which we are but too liable at this season. In the first place, they quench the thirst by their sharpness, which contracts the glands, cools the parched tongue, and moistens the dry palate. This method of appeasing the thirst in hot weather, is much to be preferred to all those drinks with which we fill ourselves, and only the more increase our heat and perspiration. But, besides the cherries quenching our thirst in the most pleasing way, they have a cooling quality, which tempers the heat of the blood, calms the animal spirits, of which the too great impetuosity and agitation affect and weaken the nerves. Thus the wholesome juice of the cherries, their acidity, and their astringent virtue, cool us delightfully in the great heats, prevent the blood from being too thin, thicken the fluids, and keep them from corrupting.

With what goodness has the Creator provided fruit adapted to every season? In these hot months we require cooling acid fruit, and he furnishes us with abundance of it. He gives it even in such quantities, that the poor may enjoy it as well as the rich. Let us make this comfortable reflection whenever we see a cherry-tree loaded with fruit; How sad would be the fate of the labourer, who is obliged to earn his bread with the sweat of his brow, if, to refresh himself, he must have recourse to those delicious drinks reserved for the great and rich, and could provide himself with no other? Merciful Father! thou forgettest not the poor, thou suppliest their wants, thou vouchsafest to refresh them with fruits within their reach; and the cherries are as wholesome for them as lemonade and wine are
for

for the rich. What wonderful plenty is there of acid cooling fruits at this season? Our gooseberries, cucumbers, stone-fruit, and salads, are so many pleasing preservatives of health.

Let us, therefore, never see or enjoy the fruits that our Creator grants us, without acknowledging and blessing his goodness, or without making these reflections which so naturally present themselves : The heavens, the earth, the elements, and every creature, combine to make us happy. Wherever we turn our eyes, we are surrounded with the blessings of our heavenly Father. The animals, the corn, the vegetables, and the fruit ; in the vale, on the mountain, in the forest, and in the sea, all serve for our sustenance and enjoyment. The beneficent hand of the Most High is ever open to us. How great indeed are the blessings which God continually pours upon us ! How many occasions have we daily to look up to him with grateful hearts, and to bless him evermore ! Each time that we walk in the country or garden, each time that we enjoy the beauties and blessings of nature, let us think of him who is the source of every blessing and enjoyment.



JUNE XV.

THE WISDOM OBSERVABLE IN THE CONSTRUCTION OF THE BODIES OF ANIMALS.

THE formation of the animal body affords the most striking proof of divine wisdom. For, as some animals were to reside chiefly in the air, others on the earth, and others in the water, it was necessary that their construction should be conformable

conformable and adapted to their situation and different kinds of life. The wisdom with which God has done this cannot be too much admired. Every thing is so exactly disposed as each animal requires it, that, if their construction had been like any other but their own, they would have suffered by it considerably, and could not have fulfilled their destination. The birds of prey are provided with nails, strong claws, sharp and hooked bills, that they may with the more security and ease catch their prey. Those who are to seek their food in marshy places require a long small bill and long legs; as it was necessary that those which live in water should have the lower part of the body very large, a long neck, membranes or sort of oars to the feet, with an oiliness in the feathers, to make them glide smoothly. The insects that live on prey have mouths shaped like nippers; and those that suck their food are provided with a sting or trunk. Why have the hares or rabbits full-set eyes, but in order to see so much the better to avoid the snares and dangers to which they are exposed? why are the eyes of the mole so sunk and small, but that, living under ground, it does not require much sight, and because that full eyes would incommode and hinder their burrowing under ground? Why is the chrystalline of the fishes eye so round, but to compensate for the refraction of the rays of light; whereas animals that live in the air have a lenticular chrystalline, or in the form of a flat sphere? Why have animals, whose eyes move, but two, whilst those that cannot move theirs have several? Why have the animals, who seek their prey in the dark, larger pupils and more brilliant eyes? Why does the eye of the hen answer the double purpose of telescope.

telescope and microscope, but that she may seek the very smallest seeds in the earth or gravel, and discover at a distance the birds of prey that might seize upon her chicks? With what amazement must we be struck in considering the apparatus for the organs of animals in respect to their several motions! What a multitude of limbs! what suppleness! what flexibility! Some animals move slow, others quick, some with two feet, others with more, some with both wings and feet, others without either. The slowness or swiftness of motion is always regulated according to the different wants of each animal. Those that are well armed, and have courage, skill, and strength enough to defend themselves against their enemies, move more slowly than those that are defenceless. Who gave to serpents and other reptiles the power to contract and stretch out their bodies, to roll themselves up, and to dart out afterwards, from one place to another, to seize their prey? Who formed the fish in such a manner, that, by means of their bladder, they can rise and fall in the water at will? Who taught the snail to contract its body, and bring water into its little house, when it wishes to fall on the ground? What art appears in the formation of birds, in every part of their bodies, and particularly their wings! How well their body is formed for flight! Small and sharp before, and increasing gradually till it is of a proper bulk. This adapts it for cutting the air, and making itself a passage through that element. The feathers are all arranged with much art, and laid one over another in a regular order, to facilitate the motion of the body, and, at the same time, to serve as a covering to defend it from the severity of the cold and bad weather. Though firm and
close

close together, they can spread, rise up, swell, and take up more space, just as the bird requires it. The wings, which are the chief instruments of flight, are put in the most proper place to balance the body exactly. What admirable work is there not in every feather ! The quill is stiff, and hollow towards the bottom, which makes it both light and strong ; the beard of the feathers is ranged regularly, broad on one side, and narrow on the other ; which is of wonderful use in the progressive motion of birds, as well as in the close and strong texture of the wings. What proportion do we see in the manner of placing the feathers ! They are always so placed as to agree exactly with the length and strength of each feather, and the large serve to support the smaller. In the bony part of the wings, what a multitude of joints, which open, shut, or move, according as it is necessary, either to extend the wings, or draw them close to the body ! What extraordinary strength in the breast-bones and muscles, that the bird may cut the air with more rapidity ! What incomparable art in the formation of the tail, to make it in some measure serve as a rudder to direct the flight, and help the bird to ascend and descend in the air, and prevent the unsteadiness of the body and wings ! In some birds the claws are large, and furnished with membranes that extend and contract for the purpose of swimming : in others they are sharp, and bent down at the point, that they may walk the firmer, perch, seize, and hold their prey. In some the legs are long, that they may walk into and rake their food out of the water and marshes : In others they are shorter ; and in all are adapted to their way of living, and whatever they require.

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THE DEW.

THE wise Ruler of the world, who watches continually over his children, and provides for all their wants, makes use of more than one means to render the earth fruitful. Sometimes it is by inundation: It is true, that when these lay countries waste, the farmer, who only thinks of the present, gives way to ungrateful murmurs; but, in the end, if their happy consequences for the general good are properly considered, it must be allowed they are very beneficial. Sometimes

Sometimes it is by a river, which, like the Egyptian Nile, has the singular property of overflowing its banks at certain marked periods, to water a country where it never rains. Sometimes it is by rains, which fall more or less frequently, in order to cool the air, and water the parched ground. But the most common means, the surest, and most universal, and that which men the least attend to, and are least sensible of its value, is the dew. This inestimable gift of Heaven, which even in years of the greatest drought supports and preserves the plants from perishing, is those sparkling drops seen in such profusion, morning and evening, on the leaves of trees and plants. The dew does not fall from above, as was formerly imagined; it does not descend from the highest parts of our atmosphere; and still less is it the sweat of the stars, as superstition had supposed. This pretended celestial origin has probably given rise to the folly of some alchymists, who hoped to convert dew into gold. It is now generally allowed, that the dew is nothing but the sweat of the plants, and the moisture they draw from the earth. In order to be convinced of this, one need only cover a plant with a glass bell, and it will appear, that the leaves collect in the night a greater quantity of dew drops than the leaves of the other plants which are exposed to the air. This certainly would not be the case, if the dew fell from above, and if it did not rise from the ground. Nothing is more easy, either, than to comprehend how it is formed; for nobody is ignorant, that the rays of the sun and the heat which is cast on the earth, continually loosen a multitude of thin particles from off every thing; some of which rise into the atmosphere, and the rest collect in the form of drops of water. This
account

account of the dew explains it to us, how it happens that it is sometimes hurtful, and sometimes not so. Its nature evidently depends on the quality of the vapours of which it is composed. The wind carries away the light exhalations as soon as they are formed, and prevents them from falling in drops. This is the reason that there is most dew when the air is very calm. By this wise plan of the Creator, the plants can vegetate and grow in countries even where there is no rain; for the soil of those parts being sandy, porous, and very moist underneath, the heat draws out a great quantity of dew, which supplies the place of rain.

Those different methods which Providence makes use of to moisten and fertilize the earth, ought to remind us of those he employs to improve the barren heart of man, and to make it fertile in good works. Chastisement, more or less severe, blessings of every kind, exhortations, warnings given us from the example of others, and a thousand such means, are made use of by our gracious God, to lead us to himself, to sanctify us, and to induce us to bring forth the fruits of righteousness. Sometimes in the natural world there comes a storm of rain from the clouds, which deluges the country, drags every thing along with it, and makes the rivers overflow their banks. At other times, God calls the soft dew from the earth, and thus, in a manner secretly, grants the wishes of the farmer for rain. It is thus in grace he also makes use of different means to arrive at the merciful end he proposes. How many hardened hearts oblige him to speak in thunder and lightning, as formerly on Mount Sinai! Less terrible means are employed to save and affect others; with a gentle, mild, and persuasive voice, God calls them

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to himself: he awakens their consciences, and refreshes their souls with the beneficent dew of his grace. Let this conduct of our heavenly Father serve as a model for ours. Let us employ all sort of means to reclaim our fellow-creature, to make him better; but let us particularly endeavour, from the example of God, to gain him rather by kindness than by punishment. Let us imitate the beneficence of the Lord: We see how he refreshes the parched earth with dew, he revives and gives new life to the plants. Let us consider how many of our fellow-creatures are in distress, and languishing for want. Let them not languish in vain. Let us endeavour to revive their hearts with benefits, and to pour as many blessings on our fellow-creatures as the dew sheds upon the plants.

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JUNE XVII.

LIFE AND LABOURS OF THE BEE.

IN the fine days of the present season, in this time of cheerfulness and joy, every thing is in motion, every thing throughout the animal world is full of life and activity; but there are no creatures so active as the little republic of bees. At least, of all the insects round us, there are none we can better learn to be acquainted with, or which can afford a more pleasing scene. The bees assemble in great numbers, either in hollow trees and cavities, or in a sort of baskets, called hives, where they are collected by the art of man. They disperse on all sides, and, by means of their trunk, they gather honey and wax from the stamina and juice of the flowers. When their harvest is made,
they

they convey it into their storehouse, which they fill from top to bottom with cells in form of hexagons. They inhabit some of these cells; others are designed to receive the eggs, and to lodge their young; and the rest serve as magazines to deposit their winter's provision of honey in. Amongst these bees, which form altogether but one family, there is one larger than any other, which is a female, and therefore called their queen. To her alone all the young bees born in a hive owe their birth. From the eggs she laid in the cells, there come out worms, which the working bees feed with their trunk. Afterwards this worm remains near fifteen days, to all appearance dead, in its cell, which is closed with a little wax lid. In this inanimate state it is called nympha. When its time is accomplished, it opens its tomb, and comes out in the form of a young bee. Besides the queen, there are in each hive two sort of bees, the drone, and the working bee. The former are males: They impregnate the queen, and serve her as a guard. The bees have two horns on their heads, which guard their eyes, and warn them of dangers. They have fangs or claws they make use of in their work, and a trunk, or hollow tube, which they can draw in and out of its case as they please. This instrument, supple and moveable in every way, reaches to the very bottom of the cup of the flowers, where they gather their honey, and passes through the case into the bag of honey placed within their bodies, from whence the honey is afterwards poured into the cells of the storehouse. The bees have six feet: With the two first, and their fangs, they form the wax or meal of the flowers into little balls; and with their middle feet they put them into a hollow, shaped like a spoon, which they have in their hind feet, which

which are also furnished with hair, in order to retain the wax, and prevent it from falling when they are flying. Laden thus, they return to their cell, without losing their way, though they are sometimes above four leagues from it. When they arrive, they find other bees waiting for them, to assist them in unloading their booty, and then they all work in common to employ those provisions for the general use of the hive. They stop every crevice with wax, to keep out any foreign animal; but leave openings for themselves to go in and out. The queen and the working bees have, at the extremity of the body, a sting inclosed in a case, which they make use of to wound or kill their enemies: But the wound they give is generally fatal to themselves, when the sting remains behind.

Every thing in those little animals must excite our admiration; the formation of their limbs, so regular and so well adapted to their kind of life, the care they take of their young, the art with which their cells are built, their activity, their industry and intelligence. Let us never pass by a bee-hive with indifference. Let us admire them, and this admiration may lead us to more sublime thoughts. If we love to reflect on our Creator, we shall find him here. This interesting scene will lead us to him, and we shall adore his wisdom, his power, and his goodness, in the production of these little creatures.

JUNE XVIII.

THE EXTERIOR PARTS OF PLANTS.

IN order to form any idea of the inimitable art which appears in the vegetable kingdom, we must go by degrees. Our understandings are too limited to see the whole together, and to acquire a perfect knowledge of it. We must be content with some observations, and pass from visible to invisible things, from simple objects and individuals, to those of greater compass, and more general. Let us begin, then, by considering their exterior parts, and let us first dwell on their roots. They are so constructed, that, by means of the principal root, fibres, and little roots which grow out of it, the plants are fastened to the ground. The pores of the root serve to receive the watery and nutritive juices which the earth contains. Out of the root grows the stem, to which the plant partly owes its strength and beauty: Its form is varied according to the nature of the plant. Sometimes the stem is formed like a pipe, strengthened by different knots. curiously placed upon it: At other times the stalk is so weak, that it requires a support round which it may twine itself, and fastens by means of some little hooks. Sometimes also the stem rises majestically, like a strong pillar, is the ornament of the forests, and seems to brave the storm of winds: The branches extend themselves like the arms of the human body, and are very regularly distributed. They spread and divide into boughs, which are placed collaterally, and in the same order as the principal branches. The buds which come upon the branches, are nothing but little plants,

plants, which being put into the ground, take root there, and become a whole, like that of which they were before only a part. The leaves, that pleasing enlivening ornament of the plants, are regularly placed round the stalks and branches. Amongst a thousand, there are not two whose leaves are perfectly alike; each has a different make, different out-line, different size, and different ornaments. The leaves are simple, or a compound, fleshy or dressed, smooth or indented, and curled. The blossoms of trees, whose beautiful enamel forms one of the greatest ornaments of nature, are not less varied than the leaves; some are plain, and have but one flower, others have several: here we see a vase opening gracefully; there we see figures in the shape of a mouth, an helmet, a bell, a star, or a sun: a little farther, we observe the papilionaceous, so called, because they a little resemble a butterfly with spread wings. Some leaves or petals are placed carelessly round the plant; others form circles, bouquets, garlands, &c. round it. From the centre of the blossom rises a little pillar, sometimes more than one, which are hollow within, round, and often pointed at top; they are called pistils. Round them there are generally other lesser pillars, called stamina, to support the heads, which are a sort of cases full of very fine powder. How is it possible to describe the delicate texture of many of the blossoms, the sweetness of their perfume, the liveliness, variety, and beauty of their colours! After the blossoms, come the fruit; which supply what is necessary for the use of men and animals. The berries and fruit contain, under one or several coats, the seed of future plants. The outward forms

forms of the fruit and seeds vary as much as those of the leaves and blossoms.

There is scarce any form that is not distinguishable in one or other of them. All these parts of plants have their proper use and design: Let the smallest part of them be taken away, and the plant will lose some of its perfection, its beauty, growth, or increase. As extraordinary as it may appear, it is certainly true, that all those parts, without one single exception, are more or less necessary to the whole. Try the experiment, take the leaves from a tree, and it will soon wither and perish. It is the same with all the other plants. There is nothing superfluous amongst them; nothing that has not its use; nothing that does not evidently tend to the perfection of the whole. But, in discovering this connection, this harmony, this wonderful arrangement of the vegetable kingdom, in seeing that the whole is beautiful, and ordered from general laws, though differently applied, shall we not conclude that the Author of all those beauties must necessarily have infinite wisdom? This consequence is as natural as that we draw, when, on hearing a person speak, we conclude that he must be near us. Let us then raise our souls to the Creator of all things: We shall every where find him. It is for that purpose he formed the plants so magnificently, and thus displays to us their use and beauty. Let the Divine Wisdom be ever present to us: It will appear in the smallest blade of grass, if we take trouble to examine it closely. Such reflections will make us more sensible of the pleasures of summer, and still more embellish it in our eyes. The more we accustom ourselves to reflect on the wisdom of God, the more satisfaction we shall have in contemplating nature:

At each flower we behold, we shall cry out with transport,—How great is our Creator ! how admirable his wisdom !

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JUNE XIX.

HYMN OF THANKSGIVING FOR THE WORKS OF THE CREATION.

TO thee, O Lord, from whom proceedeth every blessing, and who dispensest them so bountifully, to thee belongeth glory, honour, and thanksgiving. Thou hearest the cries of the young raven, and takest pleasure in the song of the lark : vouchsafe to listen also to my voice, and accept the tribute of praises due to thee. The least of the creatures formed by thy hand proclaims thy wisdom. The traces of thy goodness and power are seen from one end of the year to the other, and are continually renewing. Each blade of grass declares the greatness of God, and our own nothingness. With parental tenderness thou providest for our necessities, and givest to men and animals their proper food. From dawn to dawn thy blessings continually succeed each other ; and even the wicked man feels the effect of thy goodness. O God ! who is like unto thee ! The earth is full of thy goodness and wisdom ! Vouchsafe to teach me, O Lord ! how to praise thee worthily. Incline my heart to love thee, and let me hereafter live only for him who heapeth such blessings upon me. It is in thy name, and in the hope of thy blessing, that the farmer sows his corn : It is thou who makest the seed fruitful. This earth, that for
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our sins had a curse laid upon it, is blessed again by its Creator, and bringeth forth fruit plentifully. Thou waterest the furrows of the fields. Thou clothest the meadows the valley, and the plain, with flowers, with groves, with trees, and herbage. Thou orderest the cool and refreshing dew to moisten our gardens and fields, and to shed fertility and abundance upon them. The barren and dry soil thou waterest with gentle rains. The cold and wet places thou warmest with the rays of the sun. The weather and the seasons thou orderest wisely, and in the manner most beneficial to mankind; and, in the midst of all the vicissitudes of heat and cold, rain and drought, we still behold the food destined for us spring up, grow, and ripen, through thy goodness. Thou coverest our fields with rich harvests, and the wings of the wind support the waving corn. Thou adornest the tops of barren rocks with grapes. Thou dressest our pasture with clover; and, by thy command, the fountains and rivulets refresh the thirsty animals. Thou causest the tree to take root, and it prospers. Thou causest a quickening sap to circulate through its trunk, and givest it force to branch out with leaves and blossoms, while the abundance of fruit, under which the boughs bend, proves the pleasure thou hast in doing good. O! let us therefore glorify our Creator, our great Benefactor! Let us bless his holy name! Let us praise his mercies with transport! Great is the Lord our God! All his works are holy and wonderful! Let us exalt his almighty name! The Lord is good! It is meet that the righteous should publish his praise for ever and ever.

JUNE XX.

CATERPILLARS.

THOUGH these insects are so disagreeable to the lovers of gardens, and so disgusting to over-delicate people, they nevertheless deserve our attention. Caterpillars generally live upon our trees, and we have such an aversion to them, that wherever we meet with them we destroy them. This is the reason we do not deign to honour them with a look, and still less to examine them attentively. And yet there is no doubt but these insects may very agreeably amuse an attentive observer of nature. Let us here try to prove it. Perhaps, by raising the curiosity of those who have hitherto neglected them, they may be induced not to trample them under foot, without at least first observing their wonderful formation, and taking from thence occasion to look up to the Creator. The number of species of caterpillars already known amounts to more than three hundred, and there are new ones daily discovering. Their shape, their colour, their form, their inclinations, and way of life, all differ in some respects; but this circumstance they have in common, that they are composed of rings, which, by moving to and fro, carry the body wherever they want to go. Nature has given them two sorts of feet, which have each their particular use. The six fore-feet are sorts of hooks, which they make use of in taking a fast hold and clinging to any thing. The soles of the hinder-feet are broad, and armed with little sharp nails. With the hooks they draw to them the leaves, the grass, and whatever they want for

for food, and they fix the fore part of their body with them while they are drawing up the hind rings. The hinder feet serve to keep them firm, and to hold by whatever they are to rest upon. When they are on a branch or a leaf, they can seize on food at some distance; for, by hooking themselves on with the hind-feet, they stand up, and raise the fore part of their body, move it about, and poise it in the air on every side, get considerably upon the leaf, reach their food, and take it with their claws. However adapted the body of the caterpillar is to its several wants, it is remarkable that its state is but transient, that the limbs last but a certain time, and that this creeping worm becomes a chrysalis, without feet or motion, till it is metamorphosed into a creature classing with the inhabitants of the air. Were it for this reason only, the caterpillars would be worth our attention. Towards the end of summer, and often sooner, after having satiated themselves with verdure, and after having changed their coat several times, they cease to eat, and begin to build a house, in order to end their life in it, with the caterpillar state, and to be afterwards transformed into butterflies. The chrysalis is full of a sort of thick milk, which serves for food to the butterfly till it comes out. When it is entirely formed, and its parts arrive at consistency, and that a gentle warmth invites it to quit its prison, it makes itself a passage through the end of the chrysalis that is largest, and at the same time the thinnest. The head (which has always been turned towards that end) disengages itself, the horns lengthen, the feet and wings spread out, the butterfly takes wing and flies away. It preserves none of its former state. The caterpillar which changed into the

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chrysalis,

chrysalis, and the butterfly that comes out of it, are two animals totally different. The former was rough, hairy, and often hideous; the other is adorned with the liveliest colours. The former limited itself to a gross food; the latter goes from flower to flower, and freely enjoys all nature, of which it is itself the ornament. Will not this description reconcile every one to these insects, and put an end to all aversion to them? Perhaps some may still think they have a right to ask, To what purpose, after all, are these caterpillars? Would it not be better to be entirely free from them? No. On the contrary, it is certain, that the world would not be as perfect as it is, if there were no caterpillars in it. Take away these insects, and you deprive the birds of a considerable part of their subsistence, As the birds were to feed on caterpillars, it was just that the Creator should ordain for their food the leaves and plants, to which they have as good a right as us. It is true that the voracity of these animals makes them sometimes troublesome to mankind; but this is an evil which the Creator permits with much wisdom. For the mischief the caterpillars sometimes do us may serve to humble us, and make us recollect the uncertainty of all our earthly possessions. And even supposing we could not penetrate into God's reasons for forming such creatures, we should not therefore have a right to deny their utility. We ought, on the contrary, to take occasion from thence to acknowledge our ignorance, and trust in the wisdom of God.

JUNE XXI.

THE BEGINNING OF SUMMER.

THIS day summer begins. Many of us have often seen the changes occasioned by this day throughout all nature : But is it known how it happens that the sun remains so long afterwards above the horizon : Why this is the longest day of the year : and why, in reckoning from this day to the end of autumn, we perceive the heat and length of the days diminish in equal proportion ? All these changes are owing to the annual course of our globe round the sun. When that body enters into the sign of Cancer, the earth is so situated, that all its northern side is turned towards the sun, because the Creator has inclined the axis of our globe towards the north, and that it preserves that direction invariably. On this direction, and on the constant parallelism of the axis, depends, properly speaking, the changes of the four seasons of the year. Let us here reflect a moment on the goodness and wisdom of God, in thus inclining the axis of the earth. If it had been in a perpendicular direction, our globe would have been a very melancholy habitation, either for plants or animals. Neither growth nor diminution of days could take place, nor the several changes of the seasons. How much to be pitied should we be who live in Germany, and consequently near the north ! The air we should breathe would be always as sharp as in March or September, and our soil would afford nothing but a little moss and grass. In a word, the greatest part of the two hemispheres would be but a frightful desert, inhabited only by a few insects. In

our climate, nature has at this time almost ended her annual work. She has already lost some of her variety. Nothing can be more green than the vines, the orchards, and the forests; but the shades of colour are not so pleasing as they were. The meadows begin to whiten, and their flowers are mowed down. The corn insensibly grows yellow, and the number of flowers diminish. The variety and brightness of them, the various notes of numberless birds, had before all the charms of novelty, and afforded us the most pleasing sensations; but now, the nearer we approach to autumn, the more these enjoyments diminish. The nightingale is silent, and the great heat makes it inconvenient to walk. Do we not here see an emblem of life? Are not the pleasures we enjoy equally transient? Even the most innocent of them, such as nature in the beauty of spring presents to us, are liable to change, and give place to other objects. What we at present observe in the summer of nature, we may observe in the summer of life. When we have attained our fortieth year, which is the beginning of a riper age, the world loses part of its charms, such as delighted us in our youth; and when we approach the autumn of life, we become a prey to cares, less calm, less serene, less lively and joyous, than we were. We observe that our strength of body insensibly wears away with age. In fine, there come days when we say, "I no longer take pleasure in them." But with what a lively sense of joy do I, at this moment, raise my soul towards thee, O Lord! who directest the seasons, who art the Father of all, and the centre of felicity! I again acknowledge thy wisdom and goodness in the regular succession of the seasons.— Grant that I may never forget thee in the enjoyment

joyment of the many pleasures which summer sheds over all nature ; thou who disposest all things, and whose glory each season proclaims. May I be so much the more inclined to it, as this may possibly be the last summer I shall live to see. Alas ! How many of my friends and acquaintance, who were last summer enjoying with me the beauty of this world, have been carried off by death, before the next summer had begun ! Perhaps I shall soon be united to them. Perhaps it is for the last time that I have contemplated, in this world, the charms of nature. I will therefore enjoy this summer as if it was to be my last. I will glorify thee, O God ! with as much ardour as if I was sure of never more having it in my power to acquit myself of this duty. I will live so as never to regret having so often seen the return of the seasons. Vouchsafe, O Lord ! by thy grace, to confirm me in these resolutions ; and as it is thou that inspirest them, give me strength also to put them in execution.

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JUNE XXII.

THE NIGHTINGALE.

THE nightingale is a musician of the first rank amongst the inhabitants of the air. When all the birds, who, during day, entertained us with their notes, cease to be heard, it is then that the voice of the nightingale is raised to animate the woods and groves. When we listen to the brilliant sounds of that voice, we are apt to conclude, that the bird must be large, that the throat must have great strength ; and the inimitable charm of her

melodious notes makes us presume she surpasses all others in the beauty of her form. But it would be to no purpose to seek these advantages in the nightingale: It is a bird of poor appearance, whose colour, form, and the whole of its exterior, is void of any thing attractive or majestic, and has nothing in the least distinguishing. Nature has, however, compensated for its plainness, by giving it a voice irresistably charming. Listen to its fine long quivering notes: What variety, sweetness, and brilliancy in them! When she begins her song, she seems to study and compose before hand the melodious notes she wishes to be heard. She begins softly: Then the notes swell gradually till they run with the rapidity of a torrent: She goes from serious to gay, from simple notes to the wildest warblings; from the lightest turns and shakes to languishing sighs; and has, throughout the whole, the art to please the ear.

This bird may give rise to many useful and edifying reflections: For example, we learn this truth from it, that homeliness of body is sometimes united with very estimable qualities, and does not exclude beauty from the soul. How unjust then are those, who, only attaching themselves to the features of the face, and to exterior qualities, praise or blame nothing but what strikes their senses, and despise those who have bodily defects. Let us learn to judge with more equity. Any man, though deprived of the advantage of figure and fortune, who proves himself by his conduct to have the soul of a sage or a saint, is by much the more worthy of our esteem. It is the perfection of the soul only that gives true merit to man, or is worthy our admiration; the rest can only seduce those who do not know the value of wisdom.

dom and virtue. Have we not often known persons, neither distinguished by rank or exterior qualities, who have done the greatest services to church and state? Crooked and deformed people have often shewn more greatness of soul than others possessed of the most beautiful person and finest form. It is a lesson not to trust to appearances. Those we despise may often prove to be superior to ourselves.

When we hear the skilful harmony of the nightingale, does it not naturally lead us to the Creator, from whom she has this talent? What wisdom must there be in the formation of this bird, to make it capable of such sounds! Lungs so delicate as those of the nightingale, the motions of which are so violent, must be easily wounded, if they had not the singular advantage of being fastened to the back-bone by a number of little sinews. The orifice of the windpipe is very large, and that is certainly what most contributes to the variety of those sounds, which, in charming the ear, fill the soul with sweet and pious joy. Is it possible not to trace a divine wisdom and providence in this? and will not even the song of the nightingale lead us to glorify the Author of all nature? Lovely songstress! I will not leave thee till I have learned from thee the art of praising my Creator and thine. Pour, with thy song, gratitude and joy into the hearts of the many insensible mortals, who, in these cheerful days, contemplate the beauties of the creation with indifference.

JUNE XXIII.

THE PLEASURES WHICH SUMMER AFFORDS TO
OUR SENSES.

SUMMER has inexpressible charms, and gives us daily proofs of the infinite beneficence of our Creator. It is the happy season in which God pours out the treasures of his blessings in the greatest abundance on every living creature. Nature, after having revived us with the pleasures of spring, is continually employed, all the summer, in providing for us every thing to please our senses, to make our subsistence easy, to satisfy our wants, and awaken in our hearts just sentiments of gratitude. Before our eyes there grows, by virtue of the secret laws of nature, an innumerable quantity of fruit in the fields and gardens; fruits which, after having pleased the sight, may be gathered and preserved for our food. The flowers afford the most agreeable variety to our senses; we admire their rich dress, and the inexhaustible fertility of nature in the multiplicity of their species. What variety and beauty also in the plants, from the humble moss to the stately oak! Let us climb the highest mountain, seek the cool shade of the woods, or descend into the valley, we shall every where find new beauties. A multitude of objects strike our eyes at once, all different from each other; but each in itself has charms enough to fix our attention. There we see innumerable flowers; here living creatures of different kinds. If we lift up our eyes, they are delighted with the blue sky; if we cast them on the ground, they are refreshed by the beautiful verdure with which it is clothed.

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Our ear is charmed with the cheerful notes of the winged songsters ; the variety and simplicity of their melody fills the soul with the sweetest sensations. The murmuring of the brooks, and the silver waves of a fine flowing river, also please the ear and eye. It is to indulge our taste that the strawberries and other pleasant fruit ripen ; while at the same time they cool the blood. Our barns and granaries are filled with the new productions of the fields and gardens, which afford us the most wholesome agreeable food. The smell is struck with the sweet perfume that exhales on every side. In a word, a thousand pleasing objects affect the senses, and raise our sensibility. Numerous flocks feed on the profusion of bountiful Nature, to procure us pleasant and wholesome milk and nourishing meats. Abundant rains moisten the ground, and open to us new sources of blessings. Tufted trees and groves afford us a delightful shade. All that we see and hear, all that taste or smell can convey, increases our pleasures, and contributes to our happiness. But the creation is a still greater and more enchanting object for the mind than for the senses. In points which the latter cannot reach, the mind discovers beauty, harmony, variety, and new pleasures.

JUNE XXIV.

A SKETCH OF THE INWARD PARTS OF THE
HUMAN BODY.

THE more difficult it is to acquire a knowledge of the inside of the human body, the more necessary is it to make use of the information
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with which we are furnished by skilful anatomists. It is with this design that I am going to give a short description of those parts.

The construction of the heart, which is placed near the middle of the breast, and is the moving principle of the whole machine, is worthy of admiration. It consists of musculous fibres curiously interwoven. Two cavities, separated from each other by a partition, and which are called ventricles, are formed in the inside of this organ. As the heart continually dilates and contracts itself, and expels from the lungs the air which it receives through the nose and mouth, this is what occasions our breathing. The lungs are of a spongy substance, which, like the bellows, extend and contract, in order to draw the air in, and let it out again. They swell out on both sides, and fill almost the whole space of the breast, to refresh it with the air it draws in, and, at the same time, to prevent the blood from too much attenuation. The breast is lined with a fine membrane, called pleura. Under the lungs is placed the stomach, which receives and digests the food. It is shaped like a purse. On the right side is the liver, which covers one side of the stomach, and by its warmth assists the digestion. It separates the bile from the blood, which collects in a particular vesicle, and descends into the bowels. The irritation it occasions there facilitates the passage of the excrements. Opposite to the liver is the spleen. It is a soft bag which stretches easily. The blood is conveyed into it by arteries, and flows out of it through the veins. Behind the liver and spleen are the kidneys. There are two of them, one to the right, the other to the left. The use of them is to separate from the mass of blood the humours which overflow into the bladder. Under these

these parts are placed the entrails, joined to the mesentary. They complete the separation of the digested food, and serve to expel the grosser parts of it out of the body. The mesentary is a great membrane, which folds several times over, and forces the entrails to fold themselves in the same manner. There are a great quantity of little veins, as fine as a hair, upon the mesentary. They are called milk veins, because they contain a juice resembling milk. In the middle of the mesentary there is a large gland, where the milky veins meet, as in their centre. A skin, full of folds, of glands, and muscles, covers over all the entrails. That part of the body called the belly, and which begins at the stomach, is separated from the breast by the midriff. It has several openings to let the vessels pass which are to descend to the lower parts. The liver and spleen are fastened to it; and the shaking of it not only occasions laughter, but serves also to disengage the spleen from the humours which incommode it.

These are the principal parts of the breast and belly; independent of which there are several others which communicate with them. At the beginning of the neck is the windpipe and the weasand. The oesophagus is the channel through which the food passes to the stomach. Through the weasand the air penetrates to the lungs. Whilst the lungs are sending back the air through this channel, the voice forms itself, at the same time the breast throws off the superfluous humours. At the entrance of the weasand there is a little lid, which opens to give passage to whatever is to go out through that pipe. The lower orifice of the stomach is provided with such another cover, which opens when the food presses upon it, and then closes upon it, to prevent

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its rising up again. In the upper part of the head is placed the brain, which is capable of receiving impressions from exterior objects. The whole mass of the brain is covered with two thin transparent membranes, one of which, called the pia mater, is the first envelope. The second, called dura mater, is interwoven with arteries and veins. Independent of these parts, each of which have their settled place, there are others spread throughout the whole body, such as the bones, the arteries, veins, lymphatic vessels, and nerves. The bones, set in their joints, partly serve to support and give the power of motion to the body, and partly to preserve and guard its noble parts. The arteries and veins are mixed throughout the whole body, in order to nourish it with the blood they convey to every part. There are also several lymphatic vessels, which generally join to certain glands, and receive a transparent yellow liquor, which they afterwards let flow throughout the body. The nerves, of which they reckon ten principal pair, are little fibres springing from the brain, and from thence are spread over the whole body to the very extremities of it. Some suppose they are hollow, and contain a sort of marrow like that of the brain. The nerves are the organs of the senses, and of all the motions of the machine. All those parts are pierced with holes, in order to let the light and subtile matter, and whatever is superfluous in the body, evaporate. These orifices are called pores. The same wisdom, so visible in the inward and solid parts of the body, is equally so in its fluid parts. The blood, the chyle, the lymph, the marrow, the bile, the nervous juices, and the different sorts of viscous and gelatinous humours, supplied by innumerable glands; their several properties, their

their design, their effects, the manner in which they are prepared, filtered, and separated from one another; their circulation, their reparation; all these prove the most astonishing art, and the most profound wisdom.

Let us sum up what has just been said in regard to the interior construction of the human body. The bones, by their solidity and their joints, form the foundation of this fine machine. The ligaments are strings which unite the parts together. The muscles are fleshy substances, which act as elastic springs. The nerves, which are dispersed over the whole body, connect all the parts together. The arteries and veins, like rivulets, convey life and health throughout. The heart, placed in the centre, is the focus, or the acting power, by means of which the blood circulates, and is preserved. The lungs, by means of another power, draw in the outward air, and expel the hurtful vapours. The stomach and intestines are the magazines where every thing that is required for the daily supply is prepared. The brain, that seat of the soul, is formed in a manner suitable to the dignity of its inhabitant. The senses, which are the soul's ministers, warn it of all that is necessary either for its pleasure or use.

Adorable Creator! with what wonderful art hast thou formed us!

JUNE XXV.

ELECTRICAL FIRE.

FROM the many experiments made in our time, no body any longer doubts the existence of electrical fire, the singular effects of which have fixed the attention of all Europe for above thirty years. It is proved, that this fire is distributed equally throughout all bodies : but it is, like the air, not perceptible to our senses, but when put in motion. It is also necessary, that when the balance is interrupted by any cause whatever, it should be restored, before we can sensibly perceive the electrical fire. Two different sorts of bodies must be marked or distinguished in this case. The one sort are such by nature, that the electrical fire, let it consist in what it may, can be produced in them, and increased by means of friction. The others receive their electrical force, not by friction, but by communicating with the first. Those of the former class are chiefly glass, pitch, rosin, sealing wax, silk, hair, and the air. All other bodies, but particularly water and metals, belong to the second. The bodies of the first kind are capable of preserving the electrical matter collected in them. Those of the second, on the contrary, lose it as quick as they receive it. Machines have been invented, in which, by means of a great wheel, a rapid motion is given to a glass globe, which, in turning round, rubs against the hand, or against a cushion. By the effect of this friction, the globe preserves its electrical force, which may be extended as far as is desired, by means of iron bars or chains, which communicate with the

the glass globe. If we put our hand on one of these bars, we receive a shock ; and if it is dark, we see bright sparks of fire come from it. If several persons together form a circle, holding each other by the hand, they will all receive the electrical stroke at the same moment ; which stroke may be made more or less violent as they please. There may be given to electrical fire sufficient force to kill not only sparrows, and other little birds, but hens, geese, ducks, and even sheep. This experiment takes place, by means of large glass bottles filled with water, and tied together with metal chains, which fasten them also to the glass globe, put in a state of friction, as mentioned before. The water conveys a great quantity of electrical matter into the inside of the bottles, and, at the same time, their outside surface loses an equal quantity of it, by means of the water which is without. A violent flash, a great explosion, a violent commotion, the combustible matter taking fire, and the death of the animals, are the consequences of this experiment. There are others also which are common to all these sorts of experiments, such as a sulphureous smell, an agitation of the air, and a new property of the electrical matter. It has been observed, that some experiments failed because the iron bars, which were to serve as electrical conductors, were too angulous and too much pointed. It was suspected that the electricity lost its force by the points : This idea was confirmed by putting the face or hand near the point of the bar, when it could be distinctly perceived that there issued from it a torrent of electrical matter. It was from thence concluded to be possible, that those points which ejected electrical matter, might also serve to attract it, and

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many experiments have proved the truth of this conclusion.

If any one should think these observations of no importance, let him consider that we may learn more and more the use of this extraordinary phenomenon of nature, from which a double use has already been drawn. The physicians have joined electricity to their art: and there are examples of its having cured paralytic limbs. Naturalists also have discovered a great analogy between lightning and electrical fire, which has given rise to new opinions upon the manner in which thunder is formed, and has changed the former ideas on that subject. Thus, from time to time, we receive new solutions of the mysteries contained in the great works of our Creator. How limited are the views of man! and how little attention is paid to important things placed before our eyes, since the phenomena just mentioned were for many ages unknown; and even now how little are we acquainted with nature! and how much have we not yet to learn?

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JUNE XXVI.

THE MANNER IN WHICH THUNDER FORMS ITSELF.

FORMERLY, and even at the beginning of this century, it was thought that thunder proceeded from the inflammation of salts, of sulphureous matter, and other substances in the air. It was imagined that there was the greatest resemblance between the effects of fire-arms and that of thunder and lightning. However, all the explanations

tions by which they endeavoured to establish this system were not sufficient to remove the difficulties which opposed it, or to account for the supposed effects. But since the phenomena produced by electrical fire have been observed with attention, it has authorised us to assign a very different cause for thunder. The perfect resemblance there is between that and electricity, have convinced the naturalists that they are the same, and that electricity is in our hands what thunder is in the hands of nature. The latter executes in the great, what we imitate in the little. It will not be difficult to convince even those who have not studied natural philosophy, if they will only take the trouble to compare the effects of thunder with those of electrical fire. The effects of thunder appear by loud noise heard at a distance, and by conflagration. Buildings that are struck with it are set in flames. Men struck with it are blackened and burned. Sometimes, however, there is no trace of fire, and it is the blow that occasions death. Their clothes are all torn to rags. The lightning casts them to a distance from the place they were in; and part of the body that has been struck is often pierced with holes. Sometimes large stones are broken by lightning, and it destroys the ground it falls upon. Electricity produces the same effects, but in a less degree. When by means of water its force is increased, the electrical lightning is followed by a very strong commotion. Very compact bodies are pierced with holes; birds and other little animals are killed by it; and every electrical flash is attended with a loud noise. That torrent also of fire which flies off hissing from the point of electrified bodies, is one of the phenomena which are found in lightning. And in regard to its swift-

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ness there is still a greater resemblance between thunder and electricity. If, during a storm, a sword or chain is hung up in the air by silken strings, they become electrical. If we put our finger near it, there will come out of it sparks of fire, more or less, in proportion to the degree of the storm, or our distance from it. In a word, all the effects of electricity appear during a storm. After such experiments it can no longer be doubted, that the air is electrified when there is a storm, and that thunder and lightning are the effects of a violent electrical fire.

Thus all that appeared wonderful and tremendous in these natural phenomena disappear by degrees, as we become better acquainted with the laws of nature. Every one, consequently, ought to have a general knowledge at least of the first principles of natural history. Superstition and fear, which often mix with our observation of nature, would soon be at an end, if we either resolved to reflect upon it ourselves with more attention, or to consult others who are well informed upon the subject. Let us make use of what we have acquired in respect to the nature of thunder, so as to banish the dread and horror which so strongly seizes our minds at the approach of a storm; and let us always look up to and trust in that God who alone worketh such great marvels. For though we can thus assign the causes of thunder, it is not therefore the less wonderful. There are even some circumstances of it that will ever be inexplicable to the most penetrating understandings. It is enough to know that the nature of the air, and of the atmosphere which surrounds us, renders this phenomenon necessary; that storms, in the hands of God, are a means of making the earth fruitful, and therefore

fore ought to incline us to pay a tribute of adoration and gratitude to our Creator.

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JUNE XXVII.

HERRINGS.

THIS is the season in which they begin to fish for herrings on the coasts of England and Scotland; by which means we shall receive, in a short time, a great quantity of these fish, which feed the poor as well as the rich during the whole year. Let us examine what is most important in the natural history of these fish. Innumerable shoals of herrings live in the Frozen sea, near the Arctic pole; but, at a certain period, they quit that place, and come in multitudes to the coasts of England and Scotland. It is not yet positively ascertained what may be the cause of this emigration. Some think it is to avoid whales and other great fish in the Frozen seas; others imagine, that the prodigious increase of the herrings obliges them to take these long voyages, and to divide into separate colonies, lest they should be in too great quantities to find sufficient food in the northern seas. Perhaps, also, it is the desire of propagation, and a peculiar instinct, which leads them to the places most favourable for the increase and preservation of their race: It is certainly these reasons in general that occasion such shoals of herrings to quit the north at the beginning of the year; for, in the month of March, a wing of their army had already reached the coasts of Iceland, and it is their western wing. The herrings are at this season so plentiful

ful there, that, by putting the shovel with which the sails are watered into the sea, there are great quantities of them taken up at a time. The eastern wing advances farther into the Baltic sea. A part of it turns towards the Cape North, sails along the coast of Norway, and enters through the southern straits into the sea. Another part gains the northern point of Jutland, then enters into the Zuyder zee, and from thence passes again through the Baltic sea, in order to return to the place from whence it set out. But the largest detachment of the eastern wing, is that which turns to the western coast, in order to advance directly to the Orkney islands, where the Dutch go to catch them. Towards the 8th of June, the sea in those parts is full of herrings. They then direct their course towards Scotland and England, where they fill all the bays and the mouths of the rivers with their fry. After having quitted England, they probably return back to their own country. The prodigious multitude of these fish is surprising: One single herring lays at least ten thousand eggs in the sea near the British coasts. This great fruitfulness makes what is said of the Dutch fishery credible, where there are annually caught about two hundred millions of herrings; a fishery which supports numbers of people, and increases the revenue of the Dutch above twenty millions of crowns.

It is but just that we should lift up our hearts to the almighty and beneficent Creator, who, by a guidance full of wisdom, causes these fish to fall into the hands of man. By how many different ways he provides for our support! All the seas, the lakes, and the rivers, are subservient to mankind, and contribute to our preservation.

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JUNE XXVIII.

ECLIPSES OF THE SUN AND MOON.

IT is shameful, that, in an age so enlightened as ours, not only the multitude, but even those who pretend to be superior to the common people, should be still so ignorant in respect to those bodies. From thence proceed the superstitious notions which are raised by eclipses of the sun and moon. If any one took the trouble to inquire into the cause of them, it would be found how absurd it is to shut up wells during an eclipse, to prevent the water from acquiring any hurtful quality, or to take other superstitious precautions, which are melancholy proofs of the ignorance and want of piety in mankind. Let us then examine into this phenomenon, because it is in itself very remarkable, and furnishes us with a new occasion to glorify our great Creator. The eclipse of the sun is an effect entirely natural. It is caused by the moon passing between the earth and the sun. But it can only take place when the moon, which is an opaque body, and dark in itself, comes nearly in a direct line between the sun and our earth. It then conceals from us part of that globe, or the whole of it. The former is called, in the almanacks, a partial eclipse, the latter a total eclipse. Thus the solar eclipse is nothing more than the situation of the earth when the moon passes between it and the sun, interrupting the solar rays. We must not imagine, that the sun is at that time really darkened. It is only concealed from us. It retains its usual splendour; and all the difference is, that the rays which issue from it cannot reach

reach us, because the moon is placed between the sun and our globe. This is the reason that a solar eclipse is never visible at the same time in all parts of our earth; for, unless the sun had really lost its light, the eclipse could not be visible at the same time in every part of the hemisphere. It is, on the contrary, always more in one country than in another, and in some places it is never seen at any time. The moon not only darkens our earth sometimes, but the latter also casts its shade upon the moon, and by that means intercepts the rays of the sun from it, either wholly or in part; and this is called an eclipse of the moon: But it can only be when the moon is at one side of the earth, and the sun at the opposite side, and consequently, when it is full moon. As that planet is really darkened by the shadow of the earth, the eclipse is perceived at the same time on all the points of an hemisphere of our globe. Some people may ask, what the use is of eclipses of the sun and moon! To those even who calculate the use of natural things from the immediate advantage that accrues from them, the eclipses are of importance. It is by their means that the true position and distance of countries and towns are known; and it is from thence that we have been able to trace accurately the geographical maps of the most remote countries. Eclipses, if well observed, serve also to confirm chronology, and to direct the navigator, by shewing him how far he is from the east or west.

However inattentive we may be to the importance of these advantages, they are not the less essential to us.

JUNE XXIX.

THE STALK OF THE WHEAT.

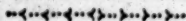
WE see that the wheat is growing every day, that the tender ears of corn are insensibly ripening, in order to furnish us, some weeks hence, with wholesome bread : A precious blessing with which nature rewards the labours of man. Let us cast our eyes on a field of wheat ; let us calculate the millions of ears of corn which cover one single field, and let us reflect on the wisdom of those laws which procure such an abundance for us. How many preparatives were necessary to furnish us with this most indispensable of all food ! How many progressive changes were to take place in nature before an ear of corn could spring up ! It is now almost ready to produce its fruit, and invites us to reflect on its construction. When the grain of wheat has been some time in the ground, it shoots upwards a stalk which rises perpendicularly, but only grows slowly, that the wheat may have time to ripen. It is for very wise reasons that it grows four or five feet high, in order to preserve the grain from the moisture of the ground, which would rot it. The height of the stalk contributes also to the depuration of the nourishing juices which the root conveys to it ; and its round form assists this operation ; for, by that means, the heat penetrates equally into every part of the stem. But how is it possible that so slender a stalk can support itself, and bear up its fruitful head, without sinking under the weight, or without being beat down by a breath of wind ? The Creator guarded against this inconvenience in the formation of

the stem. He furnished it with four very strong knots, which in some measure serve as screws, strengthening it, without taking from it the power of bending. The construction of these knots alone shews the greatest wisdom. Like a very fine sieve, they are full of little holes, and through these orifices the juices rise up, and the heat of the sun penetrates into them. The heat attenuates the juices which collect there, and purifies them, by making them pass through a sort of sieve. The stalk is liable to be beat down by storms and heavy showers of rain, but its not being thick secures it. It is flexible enough to bend without breaking. If it was harder and stiffer, it might certainly resist all weather; but would it then serve as a bed for the poor?

From out the chief stem there shoot others not so high, as well as leaves, which, collecting drops of dew and rain, furnish the plant with the nutritive juices it requires. In the mean time, the grain, that essential part of the plants, forms itself by degrees. To preserve these tender sprouts from the accidents and dangers which might destroy them at the instant of their birth, the two upper leaves of the stalk unite closely at the top, both to preserve the ear of corn, and to draw to it the nourishing juices. But as soon as the stem is formed enough to supply the grain of itself with proper juices, the leaves gradually dry and drop off, that none may be taken from the fruit, and that the root may have nothing more than necessary to nourish it. When this scaffolding is removed, the edifice itself appears in full beauty. The bearded corn waves gracefully, and its points serve for ornament, as well as defence against the birds. Refreshed with gentle rains, it thrives till the appointed time, and grows every day
more

more yellow, till sinking at last under the weight of its riches, it bends its head of itself to the sickle.

What wonderful wisdom and power appear in the construction of one single stalk of wheat, and yet we seldom pay attention to it, because it is daily before our eyes. But what other proof of goodness can the Creator give us, if we are insensible to this. Ungrateful, thoughtless man ! open thy heart to the sweet sensations of gratitude and joy. As long as thou art capable of contemplating a field of corn with indifference, thou wilt be unworthy of the food it furnishes in such abundance. Learn to think as a man, to enjoy the noblest pleasure a mortal is capable of in this world, that of tracing thy Creator in every creature.



JUNE XXX.

THE BLIGHT.

THAT is the name given to those insects which settle upon the stalks and leaves of plants in such swarms as to cover them sometimes all over. There are as many species of them as plants; and they are more worthy our attention than any other insect, on account of the singularities in them. What distinguishes them, in the first place, from any known species of animals is, that they not only lay eggs, but also produce young ones alive. In the heat of summer they are viviparous, that is to say, that the young ones come from the mother's womb completely formed and alive; undoubtedly because

the plants at that time furnish them with nourishment. Towards the middle of autumn they lay eggs, which are not hatched till the spring following; because, if the young ones were produced sooner, they would perish for want of food. Precisely at the period when the females begin to lay, the males appear; which seem to indicate that their existence was not necessary till then. This supposition is fully confirmed by many experiments. If one of the blights is taken at the moment of its birth, and shut up in a glass by itself, it will, thus sequestered, engender another like itself, when it acquires a certain degree of growth; and it will, at the end of a few days, be surrounded by a numerous family. If the experiment is repeated on one of its young, and even for many generations the result will still be the same. Let us observe another singularity: In some species of insects, the males have wings, and the females are without any, In the blight the two sexes are alike, either both produced with them, or both otherwise.—Those with wings are so small, in comparison with the others, that they walk over them as they do upon fruit. This remarkable instance of what may be called singularities in nature (an instance so contrary to the common rules) leads us naturally to enquire why there are singularities in nature, and what could induce the Creator to deviate sometimes from the common laws? In order to answer this question in a satisfactory manner, we ought to be able to take in the whole of all that is created; to know at the same time all the parts of the immense kingdom of nature, and the connection between each, before we can be capable of judging to what, or how far, any thing can be useful or hurtful to the whole.

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But so deep a knowledge of nature being denied to our weak faculties, let us content ourselves with general arguments. In the first place, God shews us, by these singularities, the command he has over all nature. He is the supreme Lawgiver, who assigns to every being the law he is inviolably to observe. He, to whom every being is subject, has a right to prescribe such and such rules ; but he has also the power to suspend his rules, and make what exceptions to them he pleases. Secondly, We find a great variety in nature, which affords us opportunities, not only to rejoice in the contemplation of it, but to admire the glory of the Creator. It is easy to conceive how much the exceptions to the general rules increase this variety, and consequently the pleasure of the observer, as well as the admiration for the Author of nature. Thirdly, Experience teaches us, that the objects we have daily before our eyes become familiar to us : and their impression, so often repeated, leaves us cold and insensible to them. The glorious sun of nature itself does not always interest us, because we have taken the habit of passing over things lightly which we see continually. Therefore every singularity, every extraordinary phenomenon, is a fresh inducement to contemplate the works of God, and serves to rouse us from our indolence. Fourthly and lastly, The singularities of the physical world, which, far from hurting the perfection of the whole, enter into the plan of Divine Wisdom, teach us, that the singularities of the moral world, and the fate of mankind, are equally under the direction of an all-wise Being, who will so order all things that his holy name may be glorified evermore.

JULY I.

FOREIGN PLANTS.

ALL our corn, and a great number of our vegetables, come from foreign countries, and generally from warmer climates than ours: most of them from Italy. Italy got them from Greece, and Greece had them from the East. When America was discovered, a great number of plants and flowers were found there, which were till then unknown, and which have since been transplanted into Europe with much success. The English still take a great deal of trouble, at this time, to cultivate the North American plants in their country. Most of the different sorts of corn, of which men and animals make their best food, are grass plants; but, though our fields are now covered with them, they are foreign to us. Rye and wheat are indigenous in Little Tartary and Siberia, where they still grow without culture. As for barley and oats, we are ignorant indeed from whence they come; but it is certain they are not indigenous in our climate, or it would not be necessary to cultivate them. Rice is the produce of Ethiopia. Since the beginning of this century, it has been cultivated also in America; and they now send us from thence, every year, vessels entirely laden with those useful seeds.—The buck-wheat comes originally from Asia: The Crusades made it known in Italy; from whence it came into Germany. Most of our herbage and vegetables also have a foreign origin. Borage comes from Syria, cresses from Crete, colliflower from Cyprus, and asparagus from Asia. We are indebted to Italy for the chervil.

chervil. Aneth comes from Portugal and Spain, fennel from the Canary Islands, annise and parsley from Egypt. Garlic is the produce of the East. Shallots come from Siberia, and horse-raddish from China. We owe the kidney-beans to the East Indies, the gourds to Astracan, the lentils to France, the potatoes to Brazil. The Spaniards found tobacco at Tobacco, a province of Jucatan in America. The ornaments of our gardens, the most beautiful flowers, are also foreign productions. Jessamine comes from the East Indies, the elder-tree from Persia, the tulip from Cappadocia, the daffodil from Italy, the lily from Syria, the tube-rose from Java and Ceylon, the carnation and pink from Italy, the aster from China, &c.

With what goodness does God thus provide for our happiness and enjoyment, by making even the most remote countries contribute towards it ! But let us, at the same time, learn the constitution of the globe which we inhabit. There is an universal transmigration over all the earth : Men, animals, and vegetables, transplant themselves, and go from one region to another, and this transmigration will only end with our globe.

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JULY II.

THE TRANSFORMATION OF THE CATER-
PILLARS.

THE transformation of the caterpillars into butterflies is certainly one of the most wonderful phenomena in nature, and deserves our attention on many accounts. The manner in which the

caterpillars prepare for their change is very extraordinary. They do not all at once become butterflies, but pass to it by a middle state. After having three or four times shed its coat, the caterpillar strips itself of its last skin, and becomes a substance which does not in any thing resemble a living creature. It is wrapt up in a bag called a chrysalis, or nymphe, and which is somewhat like a child in swaddling clothes.—The caterpillar remains in that state, one, two, or three weeks, sometimes six months, till at last it comes out of this kind of sepulchre under the form of a butterfly. There are, properly speaking, two sorts of butterflies; the wings of the one are raised, and those of the other are flat; the former fly by day, the latter by night in general. The caterpillar of the night butterfly spins itself a bag, and shuts itself up, or buries itself in it, when the time for its transformation draws nigh. Those that are to be day butterflies hang themselves up in the open air, on a tree, a plant, a wall, or some such thing. For this purpose, they make themselves a small web with very fine thread, and then, turning themselves upside down, they suspend themselves so that their heads are a little turned towards the top. Some of these, and particularly those we call hairy caterpillars, remain in that state, hanging perpendicularly with their heads down.—Others spin themselves a thread, which goes round the middle of their body, and is fastened at the two sides. It is in one or other of these two ways that they prepare themselves for their great change. Thus, both sorts of caterpillars bury themselves in a manner alive, and seem to wait patiently the end of their caterpillar state, as if they foresaw, that, after a short repose, they were
were

were to receive a new existence, and would appear again under a brilliant form.

The death and resurrection of the righteous may well be compared to the transformation of the caterpillar into the butterfly. To a true Christian, death is but a sleep, a soft repose, after the pains and misery of this world; a mere moment, in which he is only deprived of motion and life, in order to appear again in glory, and to enter into a new and better existence. What is a caterpillar? A creeping worm, blind and despised, which, while it drags on its life, is exposed to numberless accidents and persecutions. Is the lot of man in this world much better? The caterpillar prepares, with great care, for its transformation, and that state of weakness and insensibility in which it is to fall for a short time. It is exactly the same with a good man. He prepares a long time before his death for this great change, and he waits with joy and tranquillity for the happy moment in which he is to enter into a better state. The sleep of the caterpillar does not last for ever; it is only the forerunner of a more perfect state. It crawls at first upon the ground; it then takes wing, and flies into the air. At first it was blind; it afterwards receives sight, and enjoys a thousand agreeable sensations unknown to it before. It formerly fed stupidly on gross food; it now goes from flower to flower, living on honey and dew, and continually varying its enjoyments. In all this, we behold a lively image of the death and resurrection of the righteous man. His weak earthly body appears again in a glorious state of perfection after his resurrection. As a mortal, he was attached to the world, subject to passions, taken up with sensual and earthly objects; but, after his resurrection,

tion, his body is disengaged from this earth : He hovers over millions of worlds, and, with a clear and distinct view, he takes in all nature at once. His mind soars infinitely higher still ; he draws nigh even to the Deity, and gives way to the most sublime meditations. Before his death, he was blind in the pursuit of truth ; now he sees, and can behold it in its full lustre. His body being spiritual and incorruptible, he no longer requires gross food to satisfy his hunger. Very different sensations now form his happiness, and his heart overflows with purer joys. If such is the happy change we may expect, let us early prepare for it. If our present state is but transitory and imperfect, let us not make it our chief object, and let not the moments we pass here appear an eternity to us.

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JULY III.

THE SILK-WORM.

THE race of caterpillars, which divide into two general classes (those of nocturnal and diurnal butterflies), have also different families among them, each of which has its distinct character and properties. The name of silk-worm is given to one of these : This caterpillar like the others, is composed of several moveable rings, and is well furnished with feet and claws to rest and fix itself where it pleases. It has two rows of teeth, which do not move up and down like ours, but from right to left, in order to press, cut, and tear the leaves every way. The whole length of its back, we may see through its skin a vessel which swells every now and then, and performs the function of

of the heart. This worm has nine orifices on each side, which correspond with so many lungs, and assist the circulation of the chyle, or nutritive juice. Under the mouth it has a kind of reel, with two holes, through which it puts out two drops of the gum with which its bag is filled. They are like two distaffs, continually supplying the materials for making its thread. The gum which runs through the two holes, takes that form, and lengthens into a double thread, which loses suddenly its fluidity, and acquires the consistence necessary to support or to contain the worm. When it is time to be inclosed in it, it joins the two threads together, glueing them one over another with its fore feet. This double thread is not only very fine, but also very strong, and of an astonishing length. Each silkworm's bag has a silk thread near as long as 500 ells; and as this thread is double, and all along joined together, each bag must contain 1000 ells of silk, though the whole together does not weigh above two grains and an half. The life of this insect, while it is still a worm, is very short; and yet it passes through different states, which insensibly bring it to perfection. At the first coming out of the egg, it is extremely small, perfectly black, and its head is still a finer black than the rest of its body. Some days after, it begins to grow whitish, or of a dark grey colour. Its coat then becomes ragged and dirty. It throws it off, and appears in a new dress. It becomes large, and much whiter, but rather tinged with green, as it feeds on green leaves. After a few days, more or less, according to the degree of heat, and quality of its food and constitution, it ceases to eat. It goes to sleep for about two days, then works and frets itself extremely. It becomes almost

most red with the efforts it makes. Its skin wrinkles and shrivels up. It throws it off a second time, and with it casts away its feet. Behold it new dressed three times in the space of three weeks or a month. It begins again to eat, and might then pass for a different creature, so unlike in head, colour, and form, to what it was before. After having again eaten for some days, it falls again into a lethargy, in recovering from which, it changes once more its coat. That is the third skin it has thrown off since it came out of the shell. It still continues to eat some time, then renouncing all food it prepares itself a retreat, and draws out of its body a silk thread, which it wraps round itself much as we wind thread round an oval piece of wood. This consists of extreme fine silken threads. It rests quietly in the bag it has spun for itself, until the end of a fortnight, when it would break through, and make its way out, if it was not prevented by putting it into an oven or hot sun, in order to kill it. These silk bags are thrown into hot water, and stirred about with birch twigs, to loosen the ends of the silk, which are afterwards wound on reels made for the purpose.

Thus it is to a worm, or a caterpillar, that we owe the luxury of our clothing. This reflection ought to humble us. Can we be vain of the silk with which we are covered, when we consider to what we owe it, and how little we ourselves contribute towards it! Let us reflect, that even the most despicable things have been created for the advantage and use of mankind. A worm, which we scarce deign to look at, becomes a blessing to whole provinces, a considerable object of trade, and a source of riches.

JULY IV.

THE RAINBOW.

WHEN the sun reflects its rays on drops of water which fall from the clouds, and we are placed with our backs to the sun, and with the clouds opposite to us, we observe a rainbow. We may consider the drops of rain as little transparent balls, on which the rays fall, and are twice broken, and once reflected. From thence proceed the colours in the rainbow. They are seven in number, and in the following order: red, orange, yellow, green, blue, purple, and violet. These colours appear so much the more lively, according as the cloud behind is darker, and the drops of rain fall the closer. The drops, falling continually, produce a new rainbow every moment, and as each spectator has his particular situation, from whence he observes this phenomenon, it so happens, that two men cannot, properly speaking, see the same rainbow. This meteor can only last while the rain continues to fall. To consider a rainbow merely as a phenomenon of nature, it is one of the finest sights imaginable. It is a picture the most beautifully coloured of any the Creator has given us. But when we reflect, that God has made this meteor a sign of his pardon, and of the covenant he vouchsafed to make with mankind, we find subject for more than one edifying reflection. There cannot be a rainbow when it rains over the whole horizon. Every time, then, that this beautiful meteor appears, we may be certain that we have no deluge to apprehend, as in a deluge it must rain violently from every part of the sky.

Thus

Thus, when the sky is only covered with clouds on one side, and the sun appears on the other, it is a sign that these dark clouds will disperse, and that the sky will soon become serene. This is also the reason why we cannot see a rainbow unless the sun is behind us, and the rain opposite to us. The sun and rain must appear at the same time, in order to form a rainbow. No colours would be seen, if the sky was too light; therefore, where it appears, the horizon must be covered with dark clouds. Neither could the colours in the rainbow exist without the refraction of the rays of the sun upon it.

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JULY V.

THE BIRDS NESTS.

THE construction of the birds nests discovers many curious objects which cannot be indifferent to a reflecting mind desirous of information. Who is there that would not admire those regular little edifices composed of so many different materials, collected and put in order with so much care and judgement, constructed with such industry, elegance, and neatness, without any other tool than a bill and two claws! It is not so wonderful that men can erect great buildings according to the rules of art, when we consider, that the artists are indowed with reason, and have abundance of tools and materials for it. But, that a bird, unprovided with any thing for the purpose, except its bill and claws, should be capable of uniting so much regularity, solidity, and judgement, in the construction of its nest, is what we can never
too

too much admire. Nothing is more wonderful than the nest of a goldfinch. The inside of it is lined with cotton, wool, and fine silky threads. The outside is woven with thick moss, the colour of which resembles the bark of the tree on which the nest is laid, in order that it should be less observed, and less exposed to the eyes of passengers. There are some nests, in which the hair, the down, and the straws, are curiously laid across and interwoven. There are others, wherein all the parts are neatly joined and tied together with a thread, which the bird makes for itself of flax, tow, and horse-hair, and more generally of spiders webs. Some birds (for example the blackbird and lapwing) plaster over the inside of their nest with a thin coat of mortar, which cements and keeps together all the bottom parts; and then, while it is fresh, they stick some moss to it, in order to make it warm and close. The swallow's nest is of a different construction from the rest. They neither require sticks, straws, nor ligaments. They know how to compose a sort of cement, with which they make themselves nests, perfectly secure, neat, and convenient. Their method of moistening this cement is by going frequently to dip their breasts into the water, and then shaking it off upon it, till it is thoroughly steeped, after which they work it up together with their bills. But the most extraordinary of all the nests are those which certain Indian birds suspend with great art upon the branches of trees, in order to secure themselves from the pursuit of several animals and insects. In general, each species of birds has its particular manner of placing its nest. Some build them on houses, others on trees; some under the grass, others in the ground; but all in the
manner

manner best adapted for their security, the bringing up of their young, and the preservation of their species.

Such is the wonderful instinct of birds in the construction and situation of their nests ; from whence one may naturally conclude with certainty, that they cannot be mere machines. How much industry and intelligence, skill and sagacity, activity and patience, do they shew in the building of their nests ! Is it not clear, that in all their work they propose to themselves certain designs ! They make the nest hollow, almost like the half of a globe, in order that the heat may the better concentrate there. The outside of the nest is covered with materials more or less coarse, not only to serve as a foundation, but to keep out the wind and the insects. The inside is lined with more delicate materials, such as wool and down, to make it soft and warm for their young ones to lie on. Is it not a kind of reason which teaches the bird to place its nest so as to be sheltered from rain, and to be out of the reach of destructive animals ? Where do they learn they are to have eggs, and that these eggs would require nests to prevent them from falling, and to keep them warm ? that the heat would not concentrate round the eggs if the nest was larger, nor hold all the young ones if it was smaller ? How do they know the proper size of the nest, and the number of young that are to be born ? Who teaches them not to mistake the time, and to calculate so exactly, that they never lay their eggs before the nest is finished ? Nothing that has been hitherto said in answer to these questions is satisfactory, nor can this mystery in nature be explained. It requires a more perfect knowledge of the souls of animals than we have. But
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of what nature soever these faculties of the birds may be, they are certainly the effects of a superior power and wisdom.

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JULY VI.

THE MANY ENJOYMENTS WE FIND IN
NATURE.

ON whatever part of the creation we turn our eyes, we every where find something which interests either our senses, our imagination, or our reason. All nature is so formed as to afford us numberless pleasing objects, and to supply us with a variety of enjoyments continually succeeding each other. There is no part of the day that does not afford us both sensual and mental pleasures. While the sun illuminates the horizon, the plants, the animals, with a thousand agreeable objects, strike our eyes ; and when the night spreads its veil, the majesty of the sky transports and charms us. On every side nature labours to surprise us with new pleasures. Even the smallest worm, a leaf, a grain of sand, present us with objects for admiration. We must indeed be blind and senseless, were we not struck with this infinite variety, and were we not to acknowledge in it the goodness of the Creator. The same spring, which waters the valleys, invites us to sleep, pleases the ear, and serves also to quench our thirst. The shady forest, which defends us from the intense heat of the sun, where we enjoy a delightful coolness, and where we hear the melody of various birds, feeds at the same time a multitude of animals, which are themselves food for us.

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Those trees, the blossoms of which are so pleasing to the sight, will some months hence supply us with delicious fruit; and those meadows, now covered with waving corn, will soon furnish us with a plentiful harvest. Nature presents no object to us that is not pleasing and useful in more than one respect. The merciful care of Providence ordained, that the colour of green, the most mild and pleasing to the eye, should clothe and cover the earth. It was in itself agreeable to the sight, but variety might add charms to it. For this reason we see light and shade so happily distributed, those different degrees of colour and those various shades of green. How many different sorts of green there are, which go from light to dark by a thousand degrees! Each sort of plant has its regular and peculiar colour. Landscapes, covered with woods, bushes, greens, herbs, and corn, afford a magnificent scene of verdure; in which the tincts of this colour are infinitely varied, cross one another, mix, cut, or blend themselves insensibly, and yet are always in perfect harmony. Each month affords us different plants and flowers. Those that have served their purpose are replaced by others; and thus successively prevent any void in the vegetable kingdom.—But to whom do we owe these numerous and varied gifts of nature? Who is it that provides for our wants and pleasures with such goodness and munificence? Go and ask it of all nature: The hills and the valleys will tell thee; the earth points it to our sight: the sky is a glass in which we may behold it; the storms and tempests proclaim it; the voice of thunder, the rainbow, the rain, and the snow, declare his wisdom and goodness. The green fields, the meadows covered with gilded corn, the mountains crowned with forests, raising their
heads

heads to the very clouds, the trees laden with fruit, the gardens enamelled with flowers, the rose in its full beauty, all bear the impression of his handy-work. The birds celebrate him with their melodious notes. The bounding flocks, the stag in the midst of the forest, the worm in the earth, the enormous whale, which dashes the waves afar off, and overturns and sinks large ships, the dreadful crocodile, and that moving mountain, the stately elephant; all the numerous hosts of animals, which people the air, the earth, and the sea; they all declare the glory of the Almighty, and proclaim his existence. How unpardonable should we be, were we deaf to this general voice of nature! Oh! Let us that are happy witnesses of the wonders of God, let us, in the presence of all his creatures, pay him that homage of gratitude and adoration so justly due to him. Let us not harden our hearts against such marks of his goodness. Let us look around us. Every thing reminds us of his blessings, every thing prompts us to gratitude and joy. Those rich lands where our food grows, those fields where our flocks graze, those forests which afford us shade and fuel, that sky which is over us, and gives us light, every thing invites to grateful joy. Let our souls be filled with it. Let the sense of our happiness, and of God's blessings, attend us in our walks, and follow us into solitude. We shall find that there is no satisfaction more heartfelt, more lasting, or more conformable to human nature than the calm pleasures which the contemplation of the works of God afford. The more we observe the beauties of nature, the more sensible we shall be, that our God is a God of love and mercy; and that the Christian religion is a
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source of joy, and a continual motive for grateful adoration.

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JULY VII.

REFLECTIONS ON A FLOWER-GARDEN.

SEE and behold the flower-garden, and reflect on the number of different beauties assembled together in this little space. The art and industry of man have made it a beautiful scene of the finest flowers. But what would it have been without care and culture? A wild desert, full of thistles and thorns.—Such would youth be, if they were neglected to be formed or properly educated. But when young people early receive useful instructions, and are under wise direction, they are like lovely blossoms, which delight with their beauty, and will soon produce fruit beneficial to society. Behold the night violet or the Julian flower, which towards evening scents our gardens with its perfume, in which it is superior to all others, but has no beauty. It is scarcely like a flower. It is little, and of a grey colour, tinged with green, so that it can scarce be distinguished from the leaves. Modest, without show or pretensions, it perfumes the whole garden, although it is not observed in the multitude; and it is difficult to believe, that a flower so insignificant in appearance can shed so sweet and pleasing a perfume. It is like a person who has much wit, and whom nature has compensated for the want of beauty by more solid endowments. The righteous man often does good in secret, and in obscurity, and sheds around him the perfume of good works; and when we wish to be acquainted with this beneficent

ficent man, we find that there is nothing of distinction, either in his person, condition, or rank. In the carnation, beauty and perfume are both united; and it is certainly the most perfect of all flowers. It almost equals the tulip in its colours, and it surpasses it in the multitude of its leaves, and the elegance of its form. This flower is the emblem of a person who possesses both wit and beauty, and knows how to conciliate the love and respect of his fellow-creatures. Let us now observe the rose; its colour, form, perfume, every thing in this flower charms us. But it appears to be the slightest and most frail of any, and soon loses the beauty which distinguishes it from other flowers. This is an useful lesson for those who shine only in beauty; and it ought to teach them not to be vain of their charms, or trust too much to them.

In general, it is a melancholy sight to see, in this fine season, the ground already strewed with so many faded and dead flowers. We ought not, however, to complain that Providence does not give more stability to them. The world is a great stage, where we are not always to see the same actors. It is right that those who have finished their parts should retire and make room for others. This is what the variety of God's works requires, a variety which constitutes part of their perfection. We are also sensible to the charms of novelty; it is therefore necessary that the first objects should disappear. If flowers preserved their bloom the whole year, they would not please us as much as they do by only lasting a few months. Their absence makes us wish their return. If they were continually before us, we should soon be satiated and disgusted. When we have seen an object in all its different points of view,

view, we have in some manner exhausted its beauty, we become indifferent to it, and we aspire after new pleasures. The variation and continual succession of earthly blessings is therefore a means which Providence makes use of to render our lives constantly agreeable.

Such is worldly happiness. All is vanity. "All flesh is as grass, and all the glory of man as the flower of grass. The grass withereth, and the flower thereof falleth away." The lilies and roses in a beautiful face fade as well as the flowers of the garden, and death leaves no traces of them. Let us then be wise enough to seek our peace and happiness in constant and durable blessings. Wisdom, virtue, and the advantages of true Christianity, never fade. They are inexhaustible sources of endless joy.

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JULY VIII.

DESCRIPTION OF THE COMMON PHENOMENA OF A STORM.

HOWEVER formidable the phenomena of thunder-storms may be, there is something so great and curious in them, that their different effects are well worth inquiring into. It is the more so, as excessive fright often prevents us from considering, with sufficient attention, this noble sight. When an electrified cloud approaches near enough to a tower, or a house, or to a cloud not electrified, so that a spark flies from it, this occasions the explosion which we call a clap of thunder. The light we then see is the lightning, or the thunderbolt. Sometimes we see only a sudden

sudden and momentary flash; at other times, it is a train of fire, taking different forms and directions. The explosion attending the lightning shews, that it is the vapours which occasion the thunder; by taking fire suddenly, they agitate and dilate the air violently. At every electrical spark, a clap is heard. The thunder is sometimes composed of several claps, or prolonged and multiplied by echoes. There is generally some space of time between the lightning and the clap of thunder, by which we may, in some measure, judge of the greatness or nearness of the danger: For it requires a considerable time for the sound to reach the ear; whereas the lightning goes through the same space, and reaches our sight much more swiftly. Therefore, as soon as we see a flash of lightning, we have only to reckon the seconds in a watch, or how often our pulse beats, between the flash and the clap. Whoever can reckon ten pulsations, between the lightning and the thunder, is still at the distance of a quarter of a league from the storm; for it is calculated that the sound takes near the time of forty pulsations in going a league. The lightning does not always go in a direct line from top to bottom: it often winds about, and goes zig-zag, and sometimes it does not lighten till very near the ground. The combustible matter which reaches the ground, or takes fire near it, never fails to strike. But sometimes it is not strong enough to approach us, and like an ill-charged cannon, it disperses in the atmosphere, and does no harm. When, on the contrary, the fiery exhalations reach the ground, they sometimes make terrible havock. But, as uncultivated and desert places, where there are neither men nor habitations, fill the largest part of our globe,

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lightning may fall millions of times without doing any real mischief. The course of the lightning is very singular, and it is always uncertain. It depends on the direction of the wind, the quantity of exhalations, &c. The lightning goes wherever it can meet with combustible matter, as, when a grain of gunpowder is lighted, the flame runs along the train, and sets every thing it meets on fire. We may judge of the prodigious force of the lightning, by the wonderful effects it produces. The heat of the flame is such, that it burns and consumes every thing that is combustible. It even melts metals; but it often spares what is contained in them, when they are of a substance not too close to leave the passage free. It is by the velocity of the lightning, that the bones of men and animals are sometimes calcined, while the flesh remains unhurt: that the strongest buildings are thrown down, trees split or torn up by the root, the thickest walls pierced, stones and rocks broken and reduced to ashes. It is to the rarification, and violent motion of the air, produced by the heat and velocity of the lightning, that we must attribute the death of men and animals found suffocated, without any appearance of having been struck by lightning.

Let us reflect seriously on these strange and dreadful phenomena. We behold a heavy black cloud: It is the tabernacle of the Most High. It descends towards the earth. It is the Lord who "bows the heavens, and comes down with darkness under his feet." The wind rises, the storm begins, but God himself is in the whirlwind, and "walketh upon the wings of the wind." At his command the clouds disperse, and the thunder, lightning, and hail, are seen to fly. "Listen at-
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might hurt them. They even attend to preserving a proper degree of warmth about them. Their painful labours in summer-time, when heaping up provisions, have scarce any object but the support of their young, as they themselves require no food in winter, being asleep, or insensible, till spring. As soon as their young are out of the egg, they employ themselves in feeding them; and it still costs them more trouble. They generally have several houses, and they convey their young from one habitation to some other which they wish to people. According as the weather is hot or cold, dry or rainy, they bring their chrysalis near the surface of the earth, or remove them from it. They bring them to the surface in mild weather, and even sometimes after rain, lay them in a bright sun, or after a long drought, in a gentle dew. But at the approach of night, rain, or cold, they take up their little ones in their paws, and carry them so low down into the earth, that it is sometimes necessary to dig above a foot deep in order to find them. There are several sorts of these insects: The wood-ants never lie but in forests or bushes, and do no harm to fields. There are two species of these, the red and the black. Some settle in the ground in dry soils, and generally choose places where they find roots of fir-trees or birch, to make their habitations. Others live on old trunks of trees above ground, high enough to be out of the reach of its moisture. They make themselves apartments in the cavities of the trunk, and cover them with straw and other things, to shelter them from snow or rain. The field-ants are also both black and red as well as the others, but they are smaller. They settle either in the corn or the field. When the weather

ther is dry, they bury themselves pretty deep; but as soon as it becomes rainy, they raise their habitations higher and higher, according as there is more or less damp; and when it abates, they never fail of returning to their subterraneous apartments. It is also to be observed, that the ants acquire wings; and that, towards autumn, they are seen to fly in swarms over ditches and other water. But, are these mischievous insects worthy our attention, spoiling, as they do, our fields and meadows! By their subterraneous works they make the ground hollow, tear it up, and prevent the plants and roots from growing. They are reproached more still. They are enemies to the bees and silk-worms; and they are supposed to hurt the flowers, and particularly the young trees. It is said, they devour the buds and shoots; and that, getting under the bark of trees, they gnaw them to the quick. For this reason, the ants are destroyed wherever they are found. If the ants gathered honey, though at the expence of a million of other creatures, they would be highly valued, but, because their labours hurt some useful plants, we think ourselves authorised to destroy them. Suppose even that in reality they do us some harm, are they therefore less worthy our attention? Do none deserve our observation, but such as are useful to us? Let us banish this prejudice. Even the ants may afford us instruction and amusement. The form of their limbs, their industry, their indefatigable labour, the police of their republic, their tender care of their young, and perhaps a thousand other qualities, which we are not acquainted with, might convince us of the wisdom of that great Being, who is their Creator as well as ours. For, of all the works of God,

there is not one which has not its use, and is not worthy of admiration, however useless, or even hurtful, it may appear at first sight. The supreme Creator, by whom all things exist, has created nothing without design, nothing that has not its use and purpose. The trees have not a leaf, our meadows have not a blade of grass, nor our flowers a fibre, that is useless.



JULY X.

THE HAIL.

HAIL is nothing but drops of rain, which, freezing in the air, fall in pieces of a spherical, oblong, or angular form. It appears extraordinary, that, in the very warmest seasons of the year, vapours should freeze in the atmosphere. We may consider that even in the greatest heats, the upper region of the air is cold to a sensible degree, and full of snow. If it was not so, how could the highest mountains remain the whole summer covered with snow. In the hottest parts of America, it is so severely cold on the highest mountains, that there is continual danger of being frozen; and of course, it would snow from this extreme cold in the upper region of the atmosphere in the very middle of summer, if the snow did not melt in falling before it reaches the ground. But when these particles of snow collect together, the drops begin to freeze; and, as in falling, they go rapidly through warmer regions of air, it happens, that before this warmth can have penetrated through them, their cold increases, so as to be entirely frozen. It might
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be imagined, that the cold, on the contrary, ought to abate in proportion as they pass through a warmer air. But what is the consequence in winter, when cold water, which has been exposed to the outward air, is brought into a very hot room? It freezes and becomes ice, which would not have happened if it had been put into a cold room. This is precisely the case in respect to the hail. When cold bodies pass suddenly into hot air, their cold increases to such a degree, as to turn to ice. The volatile salts, more or less dispersed through our atmosphere, contribute much to this. We must not therefore be surprised that storms are not always attended with hail, as it requires great abundance of saline vapours to occasion the sudden freezing of the drops of water. Though hail is more frequent in summer time, it falls also in other seasons: For, as in every part of the year the saline exhalations may ferment in the atmosphere, so it may hail in winter, autumn, or spring. The hailstones are sometimes round, at other times concave and hemispherical, often conic and angular. Their usual size is that of small shot or little bullets, seldom as large as nuts. It is asserted, however, that there have fallen some as large as the eggs of a goose. The difference we observe in the form and size of hailstones may proceed from many accidental causes. The winds, particularly violent winds that cross one another, certainly contribute much towards it. A hailstone may also in its fall meet several other cold particles, which considerably increase its size; and often the small hailstones meet others, and, in joining together, form into large ones. It is certain, that when the hail is very large, it does inexpressible mischief to the vintage and harvest,

fruit, &c. But this does not authorise us to consider it as a curse from Heaven, a judgement, or a punishment from God. If the violence of this meteor sometimes lays waste acres of land, and breaks millions of windows, this mischief, however great it may be, is nothing in comparison of the advantages which accrue to us from it. The hail evidently cools the air in the burning heats of summer. And it is very remarkable, that, though all the meteors appear to succeed one another without any regularity, and are all different one year from another, yet this apparent disorder never fails to produce fertility.

Here then, again, O God! thou shewest thy goodness and wisdom, therefore we will glorify thee, even in the midst of hail and storms, for thy beneficent hand worketh admirable things, and never ceases to enrich and fertilize the earth.

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JULY XI.

USE OF STORMS.

A DUTY, which ought to appear to us the more indispensable, because it is neglected by many thoughtless, ignorant, and ungrateful people, is that of considering all the phenomena of nature, in the light which may most sensibly impress upon our minds and hearts the wisdom and goodness of our heavenly Father. It is true, that it must be allowed, he sometimes makes use of natural phenomena to punish the sins of mankind; but these particular cases do not prove, that God does not chiefly, and in general, purpose to himself the good of the whole. All nature affords undeniable

niable proofs of it. We will now dwell on one single phenomenon, particularly adapted to convince us of it, and on which we require that our common opinions of it should be rectified. Are we not many of us, from our infancy, accustomed not to pronounce the words thunder and lightning without trembling? We are so unjust, that we only think of those very rare cases when storms are fatal to a very small part of the universe, while we are totally insensible to the great advantages which result from them, taken in the whole. Alas! we should soon change our language, if God, provoked at our ingratitude and complaints, was to deprive us of the blessings we derive from thunder-storms. It is true, that we are not capable of pointing out all the advantages which accrue from them, but the little we know is sufficient to fill our hearts with gratitude towards our great Benefactor. Let us represent to ourselves an atmosphere loaded with noxious and pestilential vapours, which thicken more and more by the continual exhalations of earthly bodies, so many of which are corrupt and poisonous. We must breathe this air: The preservation or destruction of our existence depends upon it. The salubrity or unwholesomeness of the air gives us life or death. We feel how we are oppressed in the stifling heat of summer: With what difficulty we breathe! what uneasiness we experience! Is it not then a great blessing, that we ought to be grateful for to God, when a salutary storm comes to purify the air from all noxious vapours; and by lighting up the saline and sulphureous particles, prevents their dangerous effects, cools the air, which recovers its elasticity, and restores us to our usual facility of breathing! Were it not for

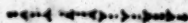
storms, the dangerous exhalations would more and more increase, and be more and more corrupt. Men and animals would perish by millions. Which is then the most reasonable, to fear, or to wish for storms? To murmur at the slight mischief they may sometimes occasion, or to bless God for the precious advantages they procure us? Let us add, that not only men and animals are benefited by purifying the air, but that it is also very useful to the vegetables. Experience teaches us, that the rain, which falls when it thunders, is the most fruitful to the earth. The saline and sulphureous particles, which fill the atmosphere during a storm, are drawn down by the rain, and become excellent nourishment for plants; without mentioning the number of little worms, seeds, and little insects, which are also drawn down in thunder-showers, and are, with the help of a microscope, visible in the drops of water.

Such reflections as these may moderate the excessive fear we have of thunder, which shews how little confidence we have in God. Instead of filling our minds with frightful and terrible ideas, let us accustom ourselves to consider a storm as a sublime and great object. Instead of speaking of the misfortunes occasioned by thunder, let us reflect rather on the necessity and great use of storms. Instead of praying to God that there may be none, let us pray that he may vouchsafe to send them now and then; or rather, let us trust entirely to that great Being who always governs the world with wisdom and goodness. Every time a storm arises, let us say, in the fulness of our hearts, and with entire faith, Almighty God! it is thou who commandest the thunder, and directest the lightning. We are
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use of in dyeing colours, and even in medicine. The unevenness of the ground has many advantages: A greater number, and a great variety of animals and plants may live on mountains; they serve to break the violence of the winds; they produce a great variety of wholesome plants and fruit, which would not do well in plains. They contain in their cavities the minerals and metals so useful to us: From them proceed the springs, and most of the rivers produced by the melting of the snow, by rain, and other vapours. The stones that are under ground serve to build walls, to make lime and glass. As to the metals, their uses are numberless: Let us only think of the many tools our workmen and artists require; the utensils and furniture of every sort made of them, which furnish us with so many conveniences and ornaments. We also draw considerable advantages from the hardness and weight of those bodies. Nobody is ignorant of the use of minerals. Salt serves to season our food, and to keep it from corrupting. The sulphureous particles of bodies render them combustible. Even volcanos and earthquakes, whatever mischief they sometimes do, are still useful and necessary. If the fire did not consume the sulphureous exhalations, they would spread too much in the air, and would make it unwholesome; many warm baths would not exist, and many minerals and metals would never be produced. It is to our ignorance we should impute it, if there are so many things of which we do not see the use. At the sight of certain phenomena in nature, sometimes hurtful to us, we ought always to remember this maxim: If God now and then permits certain imperfections to take place,
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it is that they may contribute to the greater perfection of the whole. In order to judge of the works of the Lord, and to acknowledge the wisdom of them, they must not be considered only in one point of view, but taken in the whole. Many things we think hurtful, are notwithstanding certainly of use. Others appear superfluous; and yet, if they were wanting, they would leave a void in the plan of the creation. How many things appear to us insignificant, only because we do not know the real use of them! Put a loadstone into the hands of a man who does not know its virtue, and he will scarce deign to look at it; but tell him that we owe to that stone the progress of navigation, and the discovery of a new world, and he will then be of a very different opinion. It is the same with respect to a million of things which we despise, or judge ill of, because we do not know the use of them, nor see the connection they have with the whole.

Lord! The earth is full of thy blessings; every thing that is upon it or under it, The very dust is planned with wisdom!



JULY XIII.

ON THE PHASES OF THE MOON.

ALL observation confirms to us that the moon has a particular motion of turning round the earth from west to east. For after having placed itself between us and the sun, it retires from under that body, and continues to go back towards the east, changing from day to day the place of rising. At the end of fifteen days it will have reached

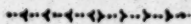
ed the most eastern part of the horizon at the time the sun sets with us. It is then in opposition. In the evening it rises above our horizon when the sun retires below it, and it sets in the morning about the time the sun rises. If, then, it continues to describe the circle which it has half finished round the earth, it removes visibly from its point opposite to the sun, it will draw nearer to the sun, and will appear later than when in opposition, till by degrees it will only be seen a little before sun rise. The revolution of the moon round the earth explains why it rises and sets at such different times, and why its phases are so various, and yet so regular. Every body knows that a globe illuminated by the sun, or by a flambeau, can only receive the light directly on one side. We perceive, at first sight, that the moon is a globe which receives its light from the sun.—When, therefore, it is in conjunction, that is to say, placed between the sun and us, it turns all its illumined side towards the sun, and its dark side towards us, and is then of course invisible. It rises and sets with the sun in the same region of the sky. This is what we call new moon, or the conjunction. But when the moon retires from under the sun, and goes back towards the east, it has then no longer all its dark side turned towards us; a small part of it, a little border of the lighted half, begins to appear. This illumined border we see on the right-side towards sunset, or even before it. The horns of this crescent turn to the left, or facing the east. The farther the moon removes from the sun, the more visible it becomes to us. At the end of seven days, when it has reached a quarter of its course round the earth, it discovers more and more of its illumined side till it shews us half of it. The light
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part is then turned towards the sun, and the dark part casts no light on us. Exactly half the moon is then illumined. The half of that half can only be the quarter of the whole globe, and it is in reality this quarter which appears to us. The moon is then in its first quarter. By degrees as the moon removes from the sun, and as the earth comes between them, the more of that part of the moon which faces us becomes light. At the end of seven days, reckoning from the first quarter, it is almost directly opposite to the sun, and then its whole illumined disk presents itself to us. It then rises in the east exactly at the moment the sun sets in the west, and we have a full moon. Next day the lighted half is already a little turned from us, and we no longer see it at all. The light gradually leaves the western side, extending itself in proportion on the half not facing the earth. This is the decrease of the moon, and the more it goes forward, the more the dark side increases, till at last half the dark side is turned towards the earth, and consequently half the light side. It has then the form of half a circle, and is what we call the last quarter.

By the admirable harmony which subsists between the motion of this planet on its own axis, and its course round the sun, it so happens, that the moon still shows us the same half of a globe which it has shewn since the beginning of the world. During so many thousands of years, this globe has constantly, and without deviating from the same course, finished its revolution in 27 days and eight hours. Regularly, and at the same periods, it has lighted sometimes our nights, and sometimes those of remote countries. With how much goodness has it pleased Divine Wisdom to grant to our earth a faithful companion to light almost
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half our nights ! Alas ! we are not properly sensible of the value of this wise plan of the Creator. But there are people who are more so than us, and to whom this light is indispensable. They must certainly be more grateful for this blessing than we generally are.

The continual changes of the moon, both in respect to its phases and its course, are lively images of the revolutions to which all earthly things are liable. Sometimes health, spirits, plenty, and a thousand other blessings, concur to make us happy, and we walk in a blaze of light, to express it so ; but, at the end of a few days, all this splendour vanishes, and there remains only the sad remembrance of having enjoyed those frail blessings. How ardently therefore ought we to wish to go from this uncertain world, to those happy regions where every blessing will appear to us so much the more valuable, as they will never be subject to change.



JULY XIV.

MINERAL WATERS.

WHETHER we consider mineral waters in respect to their formation, or the benefit that accrues to us from them, they are certainly valuable blessings bestowed upon us by God. But even the places where these salutary springs flow are seldom what they ought to be, places consecrated to praise and gratitude towards Heaven. Let the following reflections make us more grateful to our heavenly Benefactor: In the first place, are not the springs from whence we draw the common salt to season our food, worthy our attention?

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It is probable that these springs originate from the mineral salt, which the waters dissolve under ground. The mineral hot baths are not less remarkable: There is not only so great a number of them, that in Germany alone they reckon about six score, but they are also so hot, that it is necessary to let the water cool for twelve, and sometimes eighteen hours, before they are fit to bathe in. What is the cause of this extraordinary heat? It certainly is not the sun; for if it were, the waters would only preserve their heat in the daytime when the sun shines, and they would grow cold in the night or in winter. Neither can it be attributed to subterraneous fires; for then it would still be necessary to account for the medicinal virtue of these baths. The most simple cause we can give is this, that the waters, passing through ground mixed with sulphur, fire-stones, and metals, acquire this degree of heat. When the water falls on those quarries, the sulphureous and ferruginous particles which it dissolves, heat and take fire by the friction and re-action of their principles, and communicate this heat to the water. Medicinal waters, particularly the acids, are produced by the dissolving and mixing with the minerals they wash away. They are found particularly in places where there is abundance of iron, copper, sulphur, or charcoal. This is the reason there is such difference both in the effect and taste of them, in proportion as they are more or less mixed with these. They are bitter when they are produced by bitter roots, saltpetre, or copper. They are cold when they come out of rocks, or are impregnated with sal-ammoniac, saltpetre, alum, &c. Oily and bituminous substances make them oleaginous; brimstone, mixed with acids, makes them sulphureous.

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Let us admire the divine goodness which has prepared for man those salutary and inexhaustible springs. Mineral waters may certainly answer many other purposes ; but it cannot be doubted they were also produced for the preservation of the health of mankind. It is for man that the Lord has made these beneficent waters spring up. Let us then acknowledge his goodness, and be sensibly touched with it. Those particularly who experience their strengthening and salutary virtue, let their souls, penetrated with joy and gratitude, be lifted up to their heavenly Father. Let them glorify him, by imitating his example, and let their riches be sources of life and consolation to their fellow-creatures in necessity.

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JULY XV.

THE CONTINUAL ACTIVITY OF NATURE IN
THE VEGETABLE KINGDOM.

WHOEVER wishes to know why nature is never idle through the course of the whole year, has only to reflect on the numberless advantages, which result from this constant activity. Vegetables were designed for the use of men and animals ; both for food and pleasure to the former, as food only to the latter. The beneficent Creator, in order to bestow nourishment on man in the most pleasing manner, ordained that the plants, instead of coming all at once, should succeed each other. In reality, if they were produced at the same time, this purpose could not be fulfilled.—How could men find time to get in their crops and harvests, if every thing was ripe at the same time ?

time? How could all of them be preserved, as many are of very short duration, and soon lose their taste and qualities? What would then become of the pleasing sensations they afford to our sight and taste? What flavour would cherries and other summer fruit have, if we were to eat them in winter covered with snow and ice? Would not wine turn to vinegar, if the grapes were to ripen in the heats of summer? What would become of so many millions of animals, whose preservation the beneficent Creator watches over, as well as that of mankind? How could they live if all the produce of the earth came to maturity at the same time? There are an hundred sorts of insects who feed on flowers. How could they subsist if those lasted only one or two months? Could they gather enough to have always sufficient food? It is true, that most insects find none in winter; but then they fall into a sound sleep, and do not require any; which would not be the case in summer, as the heat would waken them. It is then certain, that if nature was planned otherwise, men, as well as animals, would not only suffer by it, but even perish with hunger: and we may safely assert, that their support is one of the chief designs of Providence in the constant activity of the vegetable kingdom. If we next reflect on the pleasures of sight and taste, which God has pleased to grant to man, we shall find, that for this purpose also it was necessary that nature should be thus planned. It required, not only that the flowers should be displayed in full beauty, but that there should be some all the year for our continual enjoyment. In spring, when we go to the country, in order to contemplate the many productions which the Creator causes to spring up for our food, we behold the trees in full bloom.

bloom. Towards summer, when farmers are chiefly taken up with the corn, a thousand beautiful flowers charm the sight. They appear successively, and replace each other the whole season, as long as man can enjoy this object. At last, when the cold winter arrives, and shuts us up in our houses, nature produces other vegetables, which are not indeed striking to the sight, but which have a thousand uses. All this proves, that the pleasures and comforts of mankind are purposes proposed by God in the plan of nature. Every thing is so ordained as to provide sufficient nourishment for men and animals, and also that the former should enjoy as many pleasures and comforts as possible. Consequently, some plants produce their blossoms and fruit in spring, others in summer, others in autumn or winter. Thus each has its allotted time, and appears precisely when most useful. Scarce have some done their service, when others appear in full beauty. We behold millions of plants, and they all follow the same law.

Every thing created by God is according to the same wise and regular order, though our limited understandings may sometimes prevent us from discovering the use and purpose of them. Let us therefore bless our Creator, give him glory for all things; and let us acknowledge that in all the revolutions of the vegetable kingdom, God has our welfare in view. With what gratitude ought not this thought to inspire us? And what sweet satisfaction should we not feel every time we contemplate the beauties of nature!

JULY

JULY XVI.

THE BEAUTY AND USE OF MEADOWS AND
FIELDS.

THE sight of a large beautiful garden in summer gives us a lively pleasure which our apartments do not afford, of which we can form no idea. But even the pleasure we feel from the finest garden is not to be compared to that of walking in fields and meadows. The stately tulip, the elegant narcissus, the beautiful hyacinth, none please so much as the simple flowers which enamel the fertile valley. Whatever charms the flowers may have which are cultivated in our gardens, those in the fields are still more pleasing. There is beauty in the former, but in the latter there is both use and beauty. Mere useless beauty pleases for a moment only. Is it not true, that in those long gravel walks, so even and neat, those arbours and summer-houses, those parterres with pretty borders, those walls, those inclosures; is it not true that we feel confined, and as if oppressed in them? All those places where the view is confined, seem to set bounds to our liberty.— We seem in some degree to be more independent, and more at ease, in proportion as our walk enlarges and lengthens before us. In the country, in summer, Nature, fruitful and beautiful, varies every moment her appearance; whereas, in our ornamental gardens, we continually behold the same objects. Even their order and regularity prevent us from being long pleased with them. They have nothing new to offer us, and we tire of them. The eye, on the contrary, wanders with pleasure over objects continually diversified,

versified, and extending as far as the sight can reach. It was in order to give us this enjoyment, that in most places the ground was formed smooth and even; but, to the end that we might also have pleasing distant prospects, our horizon is surrounded with rising hills. Nature has done still more: she has spared us the trouble of cultivating those flowery meads, or of watering them. An innumerable multitude of seeds are sown in them, which produce a verdure scarce ever interrupted, or which is at least easily renewed. This prodigious variety of plants with which a field is covered, is not for the sight only. They have each a seed, a blossom, qualities, and beauties, peculiar to themselves. It is true, that the same species of herbs is prodigiously multiplied in each field; but perhaps we do not make two steps without treading on an hundred different sorts, each of which has its peculiar use. To the pleasure fields afford us, our beneficent Creator has added considerable advantages. They produce plants for our food, and a wonderful number of simples, which serve for medicine. But the greatest use the fields are of to us, is the feeding, without expence, those animals we can the least dispense with. The ox, as well those whose flesh we eat as those whose labour helps to plough our ground, requires no food but grass. The horse, whose services are innumerable, demands no other recompense for his toil, than the free use of the field, or a sufficient quantity of hay. The cow, whose milk is one of the great supports of our life, asks nothing more. The field is the most complete inheritance: It is even preferable to meadows, as its produce is certain, and requires neither sowing nor labour. It only costs the slight trouble of
gathering

gathering what it yields. Its productions are not casual, for it seldom happens that fields are destroyed by drought or inundations. But it is melancholy, that men, who are generally so inattentive, so insensible to the blessings of God, should be so in this respect also. We look upon grass with contempt or indifference, perhaps because it grows under our feet, and has not been made the object of our care and culture. But whatever may be the cause of our indifference, it is certainly quite inexcusable. Would to God, that, at the sight of our meadows enamelled with flowers, we were sensibly touched with the goodness of the Creator, who, with a bountiful hand, pours out abundance for men and animals !— Would to God that we were well convinced that his mercy is every where, and that there is not a corner of the earth where we may not discover traces of his good providence ! Yes, every country, every soil, the good and the bad, the sandy and the marshy, the gravelly and the clayey, all equally proclaim the beneficence of the Preserver of the universe.

JULY XVII.

THE MORNING TWILIGHT.

IT cannot be doubted, that this phenomenon, which we daily behold, is, equally with the rest, designed for our benefit. The twilight is nothing more than a prolongation of day ; which prepares our eyes sometimes to bear the full light, and at other times the darkness of the night. But twilights are not always the same ; they vary according

according to seasons and climates. Toward the poles they last longer than in the torrid zone. The people of that zone behold the sun rise directly above their horizon, and sink down in the same direction under the lower hemisphere; by which means they are left all at once in total darkness. On the contrary, the sun reflecting its rays obliquely towards the poles, and not sinking much below the horizon of the neighbouring people, their nights, though long, are almost all along attended with the twilight; therefore not dark. It is an happiness for the former to have scarce any twilight, and for the others to have an almost constant dawn. As for us, who are placed nearly at an equal distance from the torrid and frigid zones, we plainly observe that our twilights become shorter in proportion as the days shorten; and that they increase as the days lengthen. We enjoy day-light an hour and more after the sun has set. The twilight is equally long before the sun rises above the horizon. We owe this useful circumstance to the properties of the air. God hath surrounded the earth with an atmosphere, which rises very high. He formed such proportion between this air and the light which comes upon it, that when it enters directly down into it, nothing can obstruct its course; but when a ray enters sideways, or obliquely, into this air, the ray, instead of passing through the air in a direct line, bends or descends a little lower; so that most of the rays which pierce the atmosphere alongside of the earth, fall again, by means of this inflection, upon the earth. Instead of following their course in passing by the side, they are bent by the air, and directed towards the earth. Thus, when the sun approaches our horizon, many of its rays which
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pass by us, and are not sent towards us, meet the mass of air which surrounds us, and bending in that mass they reach our eyes; so that we see daylight long before the sun itself appears. This refraction of light in the body of air which surrounds us, is a work equally full of wisdom and goodness for all the people of the earth; but it is a particular blessing to those who inhabit the frigid zones. They would be plunged in frightful darkness for several months together, if they had no twilight. Perhaps this explanation of the origin of twilights may not be intelligible to every body, but let us leave to philosophers a further detail of it, and let us limit ourselves to the reflecting on it as reasonable beings, and as Christians. It only requires an upright heart, willing to glorify his Creator. The honest, though ignorant Christian, may possibly be wiser than many philosophers, who, while they explain and calculate the twilights, lose sight of that great Being who gives to man the light of day.

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JULY XVIII.

EVENING TWILIGHT.

THE evening twilight is that faint light, which, after sun-set, still is visible in our atmosphere, particularly in the west. It is occasioned partly by the refraction and reflection of the rays of the sun in our atmosphere; and partly by the atmosphere of the sun itself, known by the name of zodaical light, which sometimes appears, but particularly towards evening in spring, and in autumn towards morning. When the sky is se-

rene; the smallest stars are visible at twilight; which continues from sun-set till the dark night, and generally lasts two hours. In the island of Senegal, where the nights are almost always as long as the days, the twilight lasts but a few moments. The interval between sun-set and the darkness of night, is scarce more than a quarter of an hour. Thus, as soon as the sun is ten or fifteen degrees below the horizon, darkness is spread over all the country, and it is like midnight. It is about the first of March, and the eleventh of October, that our twilights are the shortest. When the northern declension of the sun, and that of the equator under the horizon, are such that the sun does not descend eighteen degrees below the horizon, the twilight lasts all night. This is the reason, that in the summer solstice we have scarce any night in our countries; and that there is none in the more northern parts, though the sun is below the horizon.

The advantage which accrues to us and many other creatures from twilights is very evident. To go all at once from broad day to dark night, would be very inconvenient. So sudden a change would hurt the organs of sight. Travellers would lose their way, surprised with sudden night; and birds be in danger of perishing. The wise Author of nature has prevented all this, as by means of twilight we pass gently and gradually from day to night.

JULY XIX.

THE EPHEMERAL FLY.

THIS insect is called ephemeral, on account of the short duration of its life in the state of a fly. It is one of the prettiest sorts of little flies. It undergoes five transformations. First, the egg contains the principles of its life. It comes out a caterpillar, which turns into a chrysalis, afterwards into a nymphe, and ends in being a fly. This fly lays its eggs on the water, where the heat of the sun hatches them. Each egg produces a very small red worm, which winds about as it moves. They are found all summer in great abundance on ponds and marshy places. But, as soon as the water begins to grow cold, the little worm makes itself a bag, or a little house, where it passes the winter. Towards the end of that season it ceases to be a worm; it enters into its third state, and is transformed into a chrysalis. It sleeps then till spring, and becomes by degrees a pretty nymphe, or a sort of mummy, something in the form of a fish. On the day of its metamorphosis, the nymphe at first appears lifeless and without motion. At the end of six hours, the head shews itself, and rises by degrees to the surface of the water. The body afterwards disengages itself slowly and gradually till at last the whole animal comes out of the shell. The new born fly falls on the water, and remains motionless for some minutes. By degrees it begins to revive, and feebly stirs its wings. Then it moves them quicker, and tries first to walk and then to fly. As these flies are all hatched nearly at the same moment, they

are seen in swarms jumping and playing on the surface of the water for two hours. The male and female then seek each other for two more hours. Afterwards they begin again to skip and play, lay their eggs, and soon after fall down and die. Thus they finish their short life, at the end of five or six hours, and never do they survive the day that gave them birth.

Let the history of these little animals teach us how false a judgement we form of the duration of our lives in comparison of eternity. Suppose, that one of these flies had preserved its active and laborious life for twelve hours, and of course had arrived at extreme age, according to their nature, and in comparison with its companions, who had most of them died at noon. If this old insect could speak, perhaps a little before its death, towards sun-set, it would address the following discourse to the friends assembled round him: "I now see that even the longest life must end at last. The term of mine is arrived, and I do not regret it, for old age began to be a burden to me; besides, I no longer saw any thing new under the sun. All that I have seen during the course of my long life has taught me that there is nothing certain or durable here. A whole generation of ephemerals have been destroyed by a violent storm. The coolness of the air has carried off numbers of young people in their bloom. I lived in the first ages of the world. I have conversed with insects much more respectable, robust, and better informed, than any of the present generation. I can also assert for truth, that the sun which now appears so near the earth, I have seen it in the middle of the sky. Its light was formerly far more brilliant than at present, and our ancestors

cestors were much more sober and virtuous than we are. I have seen many things. I have a long experience ; and have outlived all my contemporaries. My life began exactly when the sun was rising. During years without number it has traversed the sky with majesty, and every where spread its benign warmth. But now that it is upon the decline, and going to set, I foresee that the end of all things draws nigh. O my friends ! how I flattered myself formerly that my life would be eternal ! How beautiful were the cells I had made to live in ! What hopes I founded on my good constitution, my strength, my activity, and the use of my wings ! But, after all, I have lived enough, and none of those I leave behind me will run so long and happy a course as mine." Thus might an insect speak, which had lived near twelve hours upon earth. But might not a man who had lived fourscore years hold nearly the same language. The difference between twelve hours and fourscore years is nothing when compared with eternity. Do we, in general, make a better use of our fourscore years, than the fly does of its twelve hours ?

JULY XX.

NOTHING PERISHES IN NATURE.

IF there was any thing in the world which perished without being of use, one might doubt the wisdom of God's government. But we have reason to suppose, that, throughout the immense circle of the creation there is nothing lost, not even the smallest grain of dust ; but that every

thing exists for certain purposes, and that each answers in its way the design for which it was created. The seed which falls from a flower is not destroyed. It is often carried away by the wind to make other flowers fruitful, or it takes root in the ground and becomes a tree. Other seeds or fruit which fall are eaten by birds and other creatures. They mix with their juices, and go through digestion, and the necessary preparation to make manure for the fields, for the use of men and animals. Certain things, it is true, corrupt and dissolve; but then they become parts of some other substance, and serve, under a new form, the designs for which they would not have been proper in their former state; because, in order to do so, they required being prepared by different transformations, and by mixing with other substances. The butterfly would not have produced a butterfly, if it had not at first been a worm. No animal whatsoever, such as we see them, could have existed if the seed had not pre-existed in the first animal of its kind. Nothing then in nature is lost. Things are only separated or dissolved, in order to appear in a new form, and to become parts of some other substance. Each grain of dust may be called the seed of a new creature, and holds its place in the chain of beings, which has been produced for the perfection of the whole. If you take a handful of the sand you tread on, you perhaps destroy the lives of a million of insects which inhabited those grains of sand. If we were better acquainted with the inside of things, we might determine, with more certainty, what the other substances were in which they were in a manner concealed before, and into the composition of which they entered. But abortions, or children who die in
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the birth, ought they not to be considered as creatures that perish without having been of use? Certainly not. They fulfil (in their way) the design of the Creator, and are prepared by many changes for their future state. Nature does nothing at one step. Man was first a child, the tree a shrub. Each creature exercises its powers during its short duration, and prepares itself for a new state. The step that man must take to pass from the mere sensitive life of childhood to the rational life of a riper age, is certainly not greater than that which the child must take in its mother's womb in learning to feel. And we can no more say, that such a child has not answered the purpose, for which it was created, than we can say it of a man, because he may not here below have answered those designs which he is not to fulfil till he becomes an inhabitant of heaven. Each creature fulfils, in its way, and in proportion to its faculties, the end proposed.—Like the wheels of a watch, some move quick, others move slowly; but all tend, in a nearer or more remote manner, to the great end of their existence, and contribute, according to their power, towards the general plan formed by God. We may meet many things in nature, which will, at first sight, appear useless, and consequently to have been produced without design. We may imagine, that others have been entirely destroyed or annihilated. But let us not judge rashly, or too readily blame the ways of Providence. Let us rather believe, that all we behold, however strange and unconnected it may appear to us, is planned most wisely; and that God fulfils his designs, even when we, blind and ignorant mortals, can form no idea of the end he proposes. Let us be assured, that the hand of the Lord has

planned every thing with the highest wisdom. Let us look around ; all are connected ; every thing is in its proper place ; and nothing is owing to chance. There is not a thing in the world useless, even when turned to dust. Nothing in nature is lost. Nothing perishes, not even the smallest leaf, not a grain of sand, not one of those insects invisible to the human eye, not one of the seeds blown away by a zephyr. That stupenduous firmament, where the sun shines with such dazzling lustre ; that swarm of insects which play in the sun beams, and which we breathe without knowing it, all appeared at the word of the Creator. All exist never to end. Every thing is right, every thing is perfect throughout the universe which the Almighty has created ; and yet there are rash and presumptuous men who dare to criticise his works ! Let us not imitate such madness. Let us glorify God, and secure our own peace, by believing that nothing which ever was created perishes.

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JULY XXI.

DIFFERENCE OF ZONES.

THE Creator having made our earth in the form of a globe, and having impressed upon it a double motion, it necessarily followed, that the regions of the earth must be different from each other, not only in respect to the temperature of the air, and the seasons, but to the animals and plants also. In certain countries there is but one season ; the summer is continual there, and every day is as hot as our hottest summer days.

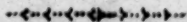
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Those countries are situated in the middle of the globe, and occupy the space called the torrid zone. The finest and richest fruit which nature produces grows there; and it is there in general where she most liberally pours forth her treasures. The days and nights are of equal length most of the year. There are, on the contrary, countries, where, during the greatest part of the year, it is so extremely cold, as to be beyond our severest winters. It is but a few weeks in the year warm enough, for the few trees and herbs which are there, to grow or become green; and in those frigid zones, neither the trees nor the earth produce fruit which mankind could feed on. The greatest inequality of day and night is there: Each of them last in their turn for whole months together. The two temperate zones, placed between the torrid and the frozen, occupy the greatest part of our globe. In those countries, four seasons appear more or less distinctly, according as they approach the torrid, or the frigid zones. The *spring*, wherein the trees and plants bud and blossom, when the heat is moderate, and the days and nights nearly equal. The *summer*, during which the fruit of the fields and trees ripen, when the heat is more intense, and the days become visibly longer than the nights. The *autumn*, when the fruit and the seeds fall off, and the grass withers, while the night again becomes equal with the day, and the heat is daily abating. The *winter*, during which the vegetation of plants totally or partly ceases, the nights lengthen, and the cold more or less increases. The countries of the temperate zones, are so situated, that in those which are near one of the sides of the torrid zone, the seasons are directly contrary to those of the other temperate zone. When it is summer

in one, it is winter in the other, &c. In these parts, nature shews more variety in the produce of the earth, and in animals, than elsewhere.— Wine is peculiar to these countries ; for the vine cannot be cultivated, either in intensely hot, or severely cold climates. Mankind, in particular, have advantages under such climates. The inhabitants of the frigid zone are stupid, are short in stature ; those of the torrid zone are of a weak constitution, have warm passions, and have less natural and intellectual powers than the inhabitants of the temperate zones. However varied the regions of our earth may be, the Creator has provided for the happiness of all who inhabit them. He ordains that each country should produce what is most requisite, according to the nature of the climate. A worm, which feeds on the leaves of the mulberry tree, spins for the people of the torrid zone a web, from which they take silk for their clothing. A tree, as well as a shrub, bears a kind of husk or shell full of fine wool, with which light stuffs are easily made. On the other hand, the cold regions abound in quadrupeds ; the skins of which serve for pelisses to the inhabitants of the north ; and they are furnished with thick forests, which supply them with abundance of fuel. That the blood of the inhabitants of the south, naturally heated, may not be too much inflamed, their fields and orchards give them cooling fruits, in such plenty, that they may send ample provision of them to other countries. In cold climates, God compensates for the want of the produce of the earth, by the great quantity of fish contained in the sea and lakes, and by the number of animals they have. Animals which indeed live in the forests, and are a subject of terror to man,
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but, at the same time, furnish him with the finest furs, good food, and many materials for domestic use. Thus, there is no region in our globe, that does not feel the greatness and goodness of the Almighty. There is no country, however barren and poor we may suppose it, where nature is not bountiful enough to provide, not only the necessities, but the comforts of life.

In every place, O beneficent Father ! thy wisdom and goodness may be traced. Even the impassable deserts, and the steep mountains of Asia and Africa, contain monuments of thy wisdom and bounty.



JULY XXII.

SINGULARITIES OF THE SEA.

THE sea is generally considered only in a terrible light, without reflecting on the wonders and blessings it so visibly presents to us. It is certainly true, that the sea is one of the most dreadful elements when its waves swell mountain-high, and the tempest roars. It then often drives the ships out of the road, and dashes them so violently, that they fill with water, and are swallowed up. Sometimes the storm drives them on banks of sand or rocks, where they are dashed to pieces. The whirlpools, or those masses of water which make the ship turn rapidly round with their current, and end in sinking or swallowing them up ; those whirlpools are occasioned by great cavities in the sea, where rocks and different currents meet. No less dangerous are the water-spouts which the wind raises from the

sea up to the sky. They hover in the air above the ocean, and the wind whirls them round with violence. They often burst with great noise, and do much mischief; for they approach a ship, fill the sails, and carry it away, then let it fall again, and dash it to pieces, or let it sink to the bottom. At least, if they do not carry it away, they break the masts, tear the sails, and sink the ship. Several vessels perish in this manner. But we should be very ungrateful to attend only to the mischief the sea does us, without deigning to reflect on the magnificent works of the Lord, and on his goodness, which shines forth even in the depths of the abyss. The first thing worthy of remark is the saltness of the sea. It is such, that a pound of water contains two ounces of salt. The sea-salt appears lighter than what we use in common; and yet it is not drawn into the air, nor does it diminish by the continual flowing in of sweet water. The cause of this is not known. There may be mountains of salt in the sea; but if so, the sea would probably be more salt in some places than in others, of which we have no certain proof. It is possible that torrents and rivers carry into the sea saltpetre and salt particles; but what would that be in such a vast extent as the ocean? This salt quality, however, be the cause of it what it may, was necessary for several purposes. It prevents the water from corrupting, and contributes to make it heavy enough to bear the greatest burdens to be conveyed from one place to another. The colour also of the sea-water deserves our observation. It is not the same every where. Besides, that in all water the colour of the bottom and of the sky appears in it, that it is black in deep abysses, white and foaming in a storm, silvered and gilded over, clouded with the most beautiful colours, when

when the rays of the setting sun shine upon it. Besides all this, the different insects, marine plants, the mixture of many things which the rivers wash into the sea, vary its colour here and there. When it is calm, it sometimes appears strewed with brilliant stars. The tract of a ship, which cuts the waves, is often luminous, and seems a river of fire. These phenomena must be partly attributed to sulphureous particles, oily and inflammable substances in the sea, and partly to shining insects. One known property of the sea is the flux and reflux. Every day, or rather in the space of 25 hours, the sea twice rises and falls. When the tide rises it is the flux; and when it falls, it is the reflux. This phenomenon is attended with several remarkable circumstances. There is always a flux and reflux at the same time in two parts of the globe, and those are opposite to each other. When our antipodes have high tides, ours are the same. The tide is always lowest when we are in the first and last quarter of the moon; and our highest tides are generally three days after the new or full moon. However, it may proceed from accidental causes, that the tide is sooner and higher one time than another. Though this phenomenon has not hitherto been perfectly accounted for or explained, it is still certain, that great advantages result to us from it, both in purifying the water, and being useful for navigation.—And wonderful as this is, there is much more to interest us. The creatures of which the sea is full might alone excite our wonder and admiration. Here a new world appears, and the number of beings of which it is composed is prodigious. The aquatic animals are not indeed so varied in their species as the terrestrial; but they surpass them in size, and their life is longer than
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that of the earth or air. The elephant and ostrich are small in comparison of the whale, which is the largest fish the sea contains. Its length is often from 60 to 70 feet. It lives as long as an oak, and consequently no land animal's life can be compared to it. If we give credit to certain accounts, there are still larger animals than the whale in the sea; a sort of lobster, called *kraken*, in the Northern Seas, which is said to be half a German mile in circumference. Who could ever give a list of the several sorts of animals which live at the bottom, and towards the surface of the sea? Who could tell their number, describe the form, construction, size, and use of these different animals? How infinitely great is the God who created the sea! This is the conclusion we must naturally draw from such reflections. It is not without very wise reasons, that the Creator ordained that the ocean and seas should occupy about two thirds of our globe. The seas were not only to be great reservoirs of water, but also, by means of vapours which arise out of them, were to become sources of rain, snow, and other such meteors. How much wisdom there appears in the connection the seas have with each other, and the continual motion the Creator has impressed upon them! It is no less worthy of observation, that the bottom of the ocean is of the same nature with the surface of the terra firma. There are found in the sea, rocks, valleys, caves, plains, springs, rivers, plants, and animals. The islands in the sea are only the tops of a long chain of mountains. And when we consider, that the sea has been less examined than any other part of the globe, we have reason to believe, that it contains still a number of wonders, to which neither the understanding nor the senses of man are adequate;

quate ; but which all prove the power and wisdom of God. Let us then adore him who has every where, in the ocean, as well as upon earth, fixed monuments of his greatness.

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JULY XXIII.

SEVERAL SHADES OBSERVABLE IN
FLOWERS.

WITH a heart-felt pleasure I cast my eyes around, and every where discover the numberless beauties the creation affords. What a lovely assemblage of colours I behold ! How pleasing and how varied the mixture ! What wonderful art in the disposition of those shades ! There, a light pencil seems to have laid on the colours : Here, they are blended according to the most exact rules of art. The colour of the ground is always such as best throws out the drawing, whilst the green, which surrounds the flower, or the shade which the leaves cast upon it, serves to set off the whole. In thus distributing and varying the colours, our gracious God seems to have had no other view than to procure us agreeable sensations.

Lord ! How great and numerous are thy works ! Thou hast wisely ordained all things. I admire the greatness of thy designs, and still more the wise means thou makest use of to fulfil them. It is with difficulty that men compass any one work. After many vain efforts, we sometimes arrive at a tolerable imitation of one single work of nature. But thou, O Supreme Power ! in a single moment, thou hast given existence to millions of beings, and created them in a state of perfection. The
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more we examine works of art, the more defective they appear: But though thy great works have been contemplated for thousands of years, a single fault could never be found in the plan, nor could any thing be imagined more perfect than the manner in which they are executed. The more we observe the works of God, the more their beauty charms us, and we continually discover new marks of greatness in these master-pieces of a divine hand. For my part, what most delights me, in the shades and colours of flowers, is their simplicity. One would suppose, that the Creator must employ an infinite number of materials, to embellish nature in such a manner, and to distribute amongst the flowers and plants so many bright, rich, and beautiful colours. But God has no occasion for painful exertions, to make the creation a scene of wonders. One single element, under his hand, assumes variety of beautiful forms. The moisture of the earth and air penetrates into the fibres of plants, and there filters through a train of transparent stalks. This is what works all the wonders, and produces all the beauty, we behold throughout the vegetable kingdom. It is the sole cause of the charms, the perfume, and growth of flowers. If each colour had its particular cause, the surprise of the spectator would lessen: but we contemplate with pleasure, and can never tire of admiring the effect of a profound wisdom, a work, which, though varied in its parts, is still simple in respect to its cause, and wherein we behold a multitude of effects depending on one single spring, which always acts in the same manner. At this moment, while I examine the variety of tints which colour the flowers, I feel more than ever the value of the reason with which I am endowed. Without
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that faculty, I should be deprived of the enjoyments they afford, and flowers would exist in vain for me. But my reason points to me the numberless beauties of flowers, the infinite variety of the colours and shades, which the fields, the valleys, the mountains, and the forests present to us. I not only know them, but am sensible of their beauty, and take a pleasure in them. I can do still more; I can from each flower raise my thoughts to the Creator, and find, even in their colour, traces of his perfection. How can I sufficiently express my gratitude for the gift of reason, that enables me to enjoy these beauties of nature, these wonderful works of God!

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JULY XXIV.

THE GREAT HEATS IN SUMMER.

IT is generally at this time we experience the greatest heat. Perhaps it may appear extraordinary to be told, that the sun, which now enters into the sign Leo, daily removes from us. When we were nearer to the sun, the heat was temperate, and now we are removed farther from it, the heat is at its height. This phenomenon agrees, however, with the laws of nature; and it is in the plan of our globe, that we must seek for the reason of it. The sun was nearer to us lately, but as its rays were not strong enough to penetrate deep into the earth, we could only perceive a moderate warmth; yet, in the space of some weeks, the earth and the bodies upon it are so far heated, that even a less degree of the sun produces more effect than in the beginning of the summer,

summer, when it acted upon cold bodies. This plan of nature displeases many; they complain of this burning heat, which weakens us, and makes us incapable of much labour. But is it not unreasonable to murmur at a plan which, being founded on the immutable laws of nature, is of course inevitable? Is it not ungrateful to our heavenly Father, to blame his government, which, in the end, never fails to produce the welfare of the world? And can any one seriously wish this season less hot? Because the heat is inconvenient, would we therefore wish the fruits, which are to serve for next winter's food, not to ripen! I repeat, that our murmurs are ungrateful to the Creator, who softens and compensates for every evil, by certain advantages annexed to them: For example, the inhabitants of the western parts of Africa, and particularly those of Cape Green, and the island of Goree, are exposed the whole year to the intense heat of the sun; but their bodies are so formed, that their health does not suffer from it; and the winds, which blow continually in those countries, serve to temper and cool the air. Is it probable that the Creator should shew less goodness to us in this respect? O how unpardonable, if ever we are insensible to the proofs he give us of it, even when we are oppressed with heat? Is it not, in the first place, an effect of his tender mercy, that the summer nights are so calculated to cool the air! The nights bring with them a coolness which prevents the air from dilating, and enables it to act so much the more forcibly on every thing. One single night revives the languishing plants, gives new vigour to the weakened animals, and so refreshes us, that we forget the weight and fatigue of the day. The storms even
which

which terrify us, are means, in the hands of the Creator, to cool the air, and moderate the heats. How many fruits also are there of a cooling quality, which abate the acrimony of bile ! A relief so much the more valuable, as the poorest among us may enjoy it. Let us cease then to complain of the heat of the sun, or the weight of suffering we labour under. They both belong to the plan of Divine Wisdom.

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JULY XXV.

SEVERAL THINGS REMARKABLE IN
ANIMALS.

OF all parts of nature, it is the animal kingdom which affords the greatest wonders ; and, to a lover of natural history, the different instincts and properties of animals are a very interesting study. But to a reflecting being, it is something more than merely an agreeable object. The animal operations teach him to trace them back to a wisdom he cannot fathom, because it surpasses all human conception. This is the effect I wish to produce, by pointing out the singularities observable in certain animals. The manner in which birds and insects lay their eggs is worth remarking. The grasshopper, the lizard, the tortoise, and crocodile, never trouble themselves about their eggs, nor the young ones that are in them. They lay their eggs in the earth, and leave to the sun the care of hatching them. Other animals, by a natural instinct, lay their eggs in places where the young find food the moment they are born. The mothers are never mistaken. The butterfly,

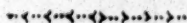
butterfly, proceeding from the cabbage-caterpillar, will not lay its eggs on meat, nor will the fly which lives on meat, lay her's on cabbage.— Certain animals are so careful of their eggs, that they carry them with them wherever they go. The spider, called the *wanderer*, carries her's in a little silken bag. When they are hatched, they range themselves in a particular order on their mother's back, who goes about with this load, and continues to take care of them for some time. Certain flies lay their eggs in the bodies of living insects, or in the nests of those insects. It is well known that there is not a plant which does not serve to feed and lodge many insects. A fly pierces through an oak-leaf, and lays an egg in the hole it has made. This wound quickly closes. The place it was in swells, and there soon appears upon it an excrescence, which they call the gall-nut. The egg that was contained in the growing gall-nut, grows with it, and the insect finds both lodging and food as soon as it is born. The care of animals for their young is scarce credible; and their love of them sometimes surpasses their love of life. With what tenderness the quadrupeds nurse their young! They cure their wounds by licking them; they convey them from one place to another, when any danger threatens; they keep them close to them, defend and guide them. If they are carnivorous, what pains the mother takes to get them meat! With what art she teaches them to catch their prey, to amuse themselves when they have got it, and then to tear it in pieces. It is impossible, without emotion, to read the account of a bitch, who, while they were dissecting her, still continued to lick her young ones, as if to seek relief from her sufferings in this maternal care, and cried out lamentably

lamentably the moment they were taken from her. The sea-dog, during a storm, conceals its young under its belly ; from whence they come out again when the fright is over. Each species of animals has its peculiar inclinations and wants. The Creator provides for both. Let us, for example, consider those which are obliged to seek their food in the water, and particularly the aquatic birds. Nature has covered their wings with a gluey oil, through which the water cannot penetrate ; by this means, they are not wet in diving, which otherwise would prevent their flying. The proportion also of their bodies differs from that of other birds. Their legs are placed more behind, that they may stand up in the water, and stretch their wings above it. To enable them to swim, their feet are furnished with webs. For the purpose of diving, they have been given a particular form of body : and, for that of seizing their prey, nature has provided them with large bills and long necks. In a word, they are formed as their way of life requires they should be. The nautilus is a sort of shell-fish, something like a snail. When it wishes to ascend, it places itself on the fore part of its shell ; and, to make itself lighter, it throws out the water. If it wishes to descend, it withdraws into the bottom of its house, which then fills with water, and becomes heavy. If it wishes to sail, it artfully turns its shell, which becomes a little gondola, and then it stretches out a thin slight membrane, which swells in the wind, and serves as a sail. Perhaps it is from the nautilus, that mankind have learned the art of navigation.

It is with the actions of animals as with their make. The same wisdom which formed their bodies, their limbs, and appointed them a common

use

use, has also planned the different actions we see them perform, and directs them towards that purpose for which they were created. The beast is led to it by the invisible hand of its Creator. It produces works which excite our admiration, and appears to act from reason. It stops when necessary, plans its work according to circumstances, and yet only follows certain secret springs, which make it move. It is an instrument which cannot judge of what it executes, but is directed by the adorable wisdom of our Creator, which has circumscribed each insect, as well as each planet, within a sphere from which it cannot deviate. When, therefore, I observe the instinct and the industry of animals, I feel a sentiment of veneration, and think I behold a scene where the Almighty Author conceals himself behind a curtain. But whoever reflects seriously on the works of nature, will every where discover the finger of God, and the examination of the wonderful construction of created beings will fill him with constant gratitude and respect for the Creator.



JULY XXVI.

THE HUMAN FACE.

EVEN the outward part of the human body declares the superiority of man over every other living creature. His face, directed towards the heavens, proclaims his dignity, which is so far imprinted on his features, that one may in some measure judge from the countenance of man, what the importance of his destination is. When the
soul

soul is in a perfect state of tranquillity, the features are calm and composed ; but when the soul is agitated and disturbed, the countenance becomes a lively picture, wherein the passions are painted with equal force and delicacy. Each affection of the mind has its particular impressions, and each change in the features is the characteristic of the most secret emotion of the heart.— The eye, in particular, so visibly expresses them, that we cannot mistake it. It is more immediately the organ of the mind than any other. The most turbulent passions, and the gentlest affections, are painted with great exactness in that mirror. The eye may therefore be called the true interpreter of the soul, and the organ of the human understanding. The colour of the eyes, their motions, more or less quick, contribute much to mark the character of the countenance. Although the eye appears to go several ways, it has, in fact, but one manner of moving, which is the turning round its centre. Our eyes are in proportion nearer to each other than those of any other living creature.

In most animals, the space between is so great that it is impossible for them to see the same object at once with both eyes, unless it should be placed at a great distance. The eye-brows and eyes are what most form the countenance. Those parts being of a kind quite different from the rest, their particular colour makes them more striking than the other features. The eye-brows are the shade of the picture, which throws out the drawing and colouring. The eye-lashes, when they are long and thick, contribute much to the beauty of the eye, and give it a more pleasing look. It is only mankind and monkeys, who have both eye-lids adorned with eye-lashes. Other
• animals

animals have none on the lower eye-lid, and man's upper eye-lid has more than the lower. The eye-brows have but two sorts of motions, which are performed by the assistance of the muscles of the fore-head. By means of one they rise, and by means of the other they fall down and draw together. The eye-lids guard the eye, and prevent the cornea from drying. The upper one can of itself rise and fall. The under one moves but little. Though we can at will move our eye-lids, it is not in our power to keep them open, when fatigue and sleep weigh them down. The fore-head is a very important part of the face, and adds considerably to its beauty, if it is well proportioned, neither too full nor too flat, too large nor too small, and if the hair growing well, forms the outline and ornament of it. The nose is the part of the face which projects most, but is the least moveable; and as it is seldom put in motion, but in violent passions, it serves more for the beauty of the whole than for any expression resulting from it. The mouth and lips, on the contrary, are susceptible of many changes; and, next to the eyes, it is the mouth which best expresses the passions, by the variety of forms it assumes. The organ of the voice also helps to animate and set it in play. The red colour of the lips, and the whiteness of the teeth, add to the charms of the face.

We have hitherto only examined the human face relatively to the regularity and beauty of the parts which compose it, without discovering the use and several purposes of those parts. But under this one point of view we already perceive the infinite wisdom of him who has, throughout all his works, united the useful with the beautiful.

JULY XXVII.

ON THE GRAVITY OF BODIES.

GOD has endowed bodies with a force which acts at all times, in all places, and in all senses. If a body endeavours to move towards one point more forcibly than to another, we say that it gravitates towards that point. For experience teaches us, that bodies are inclined to descend; or, that if they are far from the surface of the earth without support, they fall on it in a perpendicular line. It is by no means in the body itself that we must seek the cause of its weight; for a body which falls remains in the state it was put, till some exterior cause changes it. It is equally impossible that the air should occasion this gravity, since being itself heavy, it ought rather to lessen the swiftness of the fall of bodies. We must therefore seek the cause elsewhere. Perhaps the opinion nearest truth, is that which supposes the earth to have the virtue of attracting bodies placed at a certain distance, as the magnet attracts iron: Or else possibly it may be imputed to a foreign substance distributed throughout all bodies. But though we cannot positively ascertain the cause of weight, nothing is more evident than the advantages which accrue from it. Without it we should not be able to move as we do. Our centre of gravity is about the middle of our bodies. When we raise the right foot, we make the left to be the centre: If we then bend our body forward, we are near falling; but by putting out the right foot, we prevent the fall, and make a step. Thus our walk is, in some respects, a continual course of falls; during which the centre of

gravity is preserved between our feet. This is the reason we bend forward in going up a hill, and backward in coming down it. We also lean forward when we carry a load on our shoulders, and backward when we carry it before us. All this is according to the laws of gravity, which govern the motions of animals when they walk, swim, or fly. These same laws govern the motions of the immense bodies which roll in the firmament: The sun attracts the planets; and each planet in its turn attracts its satellites: Or, what is just the same, the planets gravitate towards the sun, and the satellites towards the planets; for a body made to turn round, always flies in a direct line from its centre, if it meets with no obstacle in its way. It is with the greatest swiftness that the planets run their course; and the moon is not fastened by a chain to our earth. It seems then, as if a motion so rapid as that of the moon, must throw it very far from us in the immeasurable space, if there was not a force which continually pushes it towards our globe; and which counteracts the force that removes it from hence. That first force is the gravitation of the moon towards the earth. If our earth was either lighter or heavier than it is, what would be the consequence? It would either draw too near or too far from the sun. In the first case, the heat would be insupportable; and in the latter, the cold would be equally on: every thing in our globe would be consumed or frozen. What would then become of the seasons, and a thousand things so indispensable for man, and so necessary for his happiness?

Here again, then, O supreme Wisdom! I find a monument of thy wonders. By a means so small in appearance, thou givest motion to the celestial bodies, and to all animals. By the laws of gravity
alone,

alone, thou preventest the least grain of sand from being lost upon this or any other globe. But it is in this that the greatness of thy power and wisdom consists, that often the greatest and most astonishing effects are produced by means that appear to us the most insignificant.

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JULY XXVIII.

NUMBER OF EFFECTS IN NATURE PROCEEDING
FROM ONE AND THE SAME CAUSE.

THE whole of nature is one endless chain of causes and effects; and as all parts of the universe are connected together, each motion, each event, depends on a preceding cause; and will, in its turn, become a cause of the effects which follow it. The whole constitution of the world may convince us, that it is not chance, but a divine power, and a wisdom beyond all conception, which first erected this wonderful fabric, and impressed motion upon its different parts, and regulated the great chain of events depending on and succeeding each other. This degree of knowledge is not difficult to acquire; for though that which we have of nature is very limited, we still see numberless important effects derived from causes evident to the human understanding. Many natural phenomena may furnish examples of this. What variety of effects does the heat of the sun visibly produce? It not only contributes to preserve the life of multitudes of animals, but also to the vegetation of plants, the ripening of corn and fruit, the fluidity of water, the exhalation of vapours, and formation of clouds, with-

out which neither rain nor dew would fall upon the earth. The air likewise is so constituted as to fulfil several purposes at once. By means of this element, the animal bodies are preserved, the lungs are relieved, and all the vital motions acquire force. It is the air which kindles fire, and nourishes the flame. The air, by its motion and undulation, conveys every sort of sound to the ear. It gives a spring to the winged animals; and enables them to fly from place to place. It opens to man an easy passage through the seas; the vast expanse of which he could not otherwise cross over. It is the air which supports the clouds in the atmosphere, till becoming too heavy, they fall again in rain. It is the air which prolongs the day by morning and evening twilights; and without it the gift of speech, and the sense of hearing, would be useless to us. All these blessings, and many more, depend on the formation of the air in which we live and breathe. This wonderful element, which surrounds our globe, which is too subtile to be visible to us, and yet so strong, that no element can resist its force, is it not a striking proof of the wisdom of our Creator? The force of gravitation alone, which exists in every thing, holds the earth firm, preserves the mountains, and renders water fluid. It confines the ocean in its depths, and the earth within the circle prescribed. It maintains each being in its place throughout all nature; and preserves between the celestial bodies the proper distance from each other. Who can describe the many properties of water! In general, it serves to dilute, to soften, to mix a great many bodies which we could not otherwise make use of. It is the most wholesome drink: It is the best nourishment for plants: It turns mills and several other

other machines. It procures us fish, and brings on its surface the treasures of another region. How various and innumerable the effects produced by fire ! Solid bodies are either melted and made fluid, or become again solid bodies of a different sort. It makes fluids boil, or reduces them to a vapour ; and gives heat to all other bodies ; and contributes to give sensation of sight to living creatures.

It is not only in the natural world that we see the greatest variety of effects produced by the same cause : In the moral world also, one single disposition of the mind produces no less variety of effects. Let us, for example, consider the natural inclination we have to love one another. From hence is derived the care of parents for their children ; social ties ; the connection of friendship ; patriotism ; goodness in those who govern, and fidelity in those who obey. Thus, one single propensity keeps each individual in the circle prescribed ; and forms the bond of human society ; is the principle of all virtuous actions, of all laudable pursuits, and of all innocent enjoyments. All these are most evident proofs that the world is not made by chance ; neither are the materials which compose it without connection or relation to each other. On the contrary, the world forms a regular whole, which divine power has ordained with infinite wisdom. In each part, in each phenomenon of the visible world, we discover traces of it. Yet there is much more which escapes the deepest observations of the greatest capacities ; for we cannot trace it in all its different lights.

JULY XXIX.

SOME MALADIES IN PLANTS.

VEGETABLES are subject to several maladies. Sometimes they are covered with a whitish matter, which sticks to them like dust. It does not proceed from insects, as is generally believed, but from a natural stagnation in the juices, and a beginning of corruption, which attracts the insects, and invites them to lay their eggs upon it. The stagnation of the juices is the first stage of corruption; and it is supposed that this alone is sufficient to attract insects, because they are seen swarming by millions, as soon as the circulation of juices is stopped in a tree, either by natural or other causes. This is the reason that the weakest and worst situated trees are the most frequently subject to this malady. If the insects were the cause of it, it could not be produced by art; whereas if a tree is wounded designedly, or by neglect, it will immediately bring the mildew. On a tree, thus weakened by art, millions of insects settle at once, while the neighbouring trees are free from them. Therefore this corruption should no more be imputed to insects than that of meat; it is caused by the stagnation of the juices, an accident which many circumstances may occasion. There is often something resembling dew, but which is glutinous, sweet and corrosive, that burns and spoils the plants. It was imagined that the insects conveyed this glutinous juice into vegetables, or that the bees carried their honey there. But, after many experiments, it is now allowed to be ascertained, that this matter falls from the air in the form of dew. In some countries,

tries, it lies in little drops on a number of vegetables of different sorts, without distinction ; and in the space of a night it covers almost all the leaves of a long row of trees, on which there was none before. Perhaps this dew is formed from vapours, rising from flowers and blossoms of trees, out of which the bees extract such good honey ; and if it falls more in one place than another, it is owing to the direction of the wind. Perhaps, also, this matter may be the effect of malady in the plants, when the juices are hurt, which may attract insects, like the dust before mentioned ; for it is the boughs, branches, bushes, and weak trees, that most frequently suffer from this malady. It is also observed, that the leaves, on which this sort of dew falls, spots, blackens, and spoils ; and very possibly this substance may be the cause of it.

Here again we find traces of the wisdom of the Creator ; for, as the insects require food to live upon, it is for our benefit they should be obliged to seek it in vegetables, which being spoiled, are become useless or hurtful to us. To this we owe that the animals do not deprive us of food, but choose what would be hurtful to us. It is true, that, according to the course of nature, each plant, each tree, and even each animal, serves to support some kind of animal. We revenge ourselves on the species which hurts us, and seek as much as possible to destroy them. Perhaps we should be more disposed to spare them, if we considered how little real harm they do us.

JULY XXX.

MEANS OF SUBSISTENCE WHICH NATURE AFFORDS TO ANIMALS.

IT is one of the great effects of divine goodness and power, that there is every where food enough to maintain all the living creatures with which the world is filled. It is not indeed wonderful that the countries under the temperate zone should furnish subsistence for those that live there; but that it should be the same every where else, even where it could be least expected to find food and pasture, and that such different kinds of animals should never fail of provisions, can only be attributed to the care of a wise and beneficent Providence.

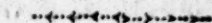
God has proportioned the food to the number and wants of the animals which are to consume it. It is almost every where to be found in abundance; but not in such profusion as to corrupt, which would be an evil to us. What is most remarkable in this is, that among so many sorts of food, the most useful and necessary are in general the most common, and multiply most easily. As there are a great many creatures which feed on grass, there are great numbers of fields covered with grass, herbs, and salubrious plants, which grow of themselves, and resist the inclemency of the air. Is it not worthy our attention, that corn, the principal food of man, can be so easily cultivated, and so astonishingly multiplied? For example, a bushel of wheat, if sowed in a good soil, may produce an hundred and fifty bushels. Is it not by a most wise direction of the Creator, the taste of animals is so different? that
some

some love to feed on herbs, others on corn, others on meat, worms, insects, &c. Some are content with a little, others are almost insatiable. If all sorts of animals fed on the same thing, the earth would soon become a vast solitude. This diversity of taste among beasts is a certain proof, that it is not by chance they like such and such food, but is owing to a natural instinct which inclines them to food adapted to the nature of their bodies. By this means all the productions of earth and sea are well disposed of. Not only every thing that breathes is richly provided for, but even that, which, by corrupting, might prove a nuisance, serves useful purposes. For the most wholesome plants would perish, the carcasses of fish, birds, and beasts, would exhale a destructive poison, were it not for the wise direction of the Creator, who ordained that different animals should choose these things for their food.

Food spontaneously offers itself to most beasts; but they require the art to discern it, and must be prudent and cautious. Their provisions are so prepared, that what is useful to one species is hurtful to another, and turns to poison. Botanists have found, from several experiments, that cows eat of 276 sorts of grass, but that they reject 218; that goats make use of 449, and that there are 126 which they do not touch. Sheep feed on 387, and there are 141 which they do not eat. The horse grazes on 262, and rejects 212. Swine are content with 72 vegetables, but there are 171 which they will not make use of. Other animals are obliged to seek their food with labour and afar off, to dig for it in the earth, or to collect it from a thousand places where it is scattered about, or even to bring it out of another element. Many are obliged to choose the

most favourable time of night to satisfy their hunger in safety ; others to prepare their food, to pick the seeds out of their shells to bruise them if hard, to swallow little stones to assist digestion, to take off the heads of the insects they feed on, to break the bones of their prey, to turn the fish, in order to swallow them by the head. Many would perish, if they did not convey future provision to their nest. Others cannot catch their prey, without laying snares or digging holes for them. Some pursue their prey on land, others in the air, and under the water.

The more varied the food of animals, and their manner of procuring it, the more admirable is the wisdom and goodness of God in their preservation.



JULY XXXI.

VARIETY IN THE STATURE OF MAN.

THE entire height of the human body varies considerably, and the more or the less is of little consequence. The usual height is from five to six feet. Some people, who live in the northern countries, along the frozen seas, are less than five feet. The least people of those known to us inhabit the tops of the mountains in the island of Madagascar; they are scarce four feet high. Many of these dwarfish people came originally from nations of a common stature; and the cause of their degeneracy must certainly be imputed to the climate they inhabit. The extreme cold most of the year there, makes both animals and vegetables small; why should it not have the same

same effect on man? On the other hand, there are whole nations of a gigantic size: The most famous of them are the Patagonians, who live near the straits of Magellan. It is asserted that they are from eight to ten feet high. Neither ought it to appear to us impossible that there should be people taller than the Europeans. Besides the traces that remain of it in history, and in the monuments of antiquity, there have been seen, even in our climates, men sometimes above six feet and an half high; who were, notwithstanding, well proportioned, healthy, and capable of all the exercise and labour which require strength and activity.

Adorable Creator ! thy wisdom is evident also in these varieties of human nature. All that thou hast brought forth in the animal, vegetable, and mineral kingdoms, has been done by weight, number, and measure. Every thing bears thy stamp : The dwarf as well as the giant ; the blade of grass as well as the oak ; the worm as well as the elephant.



AUGUST I.

MEDITATION ON THE WORKS OF NATURE.

FATHER of the universe ! Preserver of all that breathe ! how great is thy Majesty, and how many wonders thou shewest unto man ? It is thy hand which hath stretched out the heavens, and set them thick with stars. Now, at this moment, I behold the sun shining in all its splendour. To-morrow, perhaps, it will be no more for me that the birds make the woods, the fields,

and the valleys, resound with their melodious notes. I feel that I am mortal; my life fades away like the grass of the field: It withers as a leaf fallen from the branch where it grew. Who knows when these words of the Almighty will be heard by me, Man return to dust! When the grave shall have swallowed me up, when darkness and silence come upon me, when the worms have gnawed my flesh; what will then remain of my earthly possessions? Will not all be lost to me, though even all my wishes had been gratified, and I had here enjoyed unmixed happiness?—O how senseless should I be, were I to attach myself to the transitory blessings of this world! If I aspired to great riches, if I was ambitious of vain honours, and if, allowing myself to be dazzled by vain splendour, envy and pride should take possession of my heart; if too eager in my wishes, I have pursued what I ought not to aspire to, I humble myself before thee, O God. Behold here I am, may that which thou in thy wisdom directest happen unto me. Man, a being, mad with pride, prescribes laws to his Creator! he dares to blame the decrees of Eternal Wisdom! And thou, Almighty Friend of man! thou lovest them more than they love themselves, when thy goodness refuses them the deceitful enjoyments which are the objects of their wishes. When, in the morn, on the green turf covered with dew, every thing presents me a cheerful prospect, and the wings of the night have cooled the burning heat of summer, Wisdom cries out to me, O mortal! Why dost thou harbour cares? Is not God thy Father? Art not thou his child? Will not he who made thee, take care of his own work? The plan of thy existence is not limited to this earth;

earth ; it takes in heaven. Life is but a moment ; and the longest earthly felicity is but a pleasing dream. O man ! thy destination is immortality. The thought of immortality raises us above the earth, the universe, and time. It shall awaken my heart, when, seduced by false pleasures, I am inclined to quit the path of virtue. The roses which crown the head of the wicked soon fade. His shameful enjoyments dishonour him, and repentance succeeds them. I am but a sojourner upon earth, and none but immortal joys deserve pursuit.

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AUGUST II.

VEGETATION OF THE BLADE OF WHEAT.

THE blade of wheat is composed of the principal stem, of the stalks growing out of the sides, and the stalks which afterward spring out of those. It begins to form as soon as four green leaves make their appearance. If the little plant is then taken, and the under leaf is cautiously pressed, or separated, there will be seen a little white point which gradually grows into a stalk ; and under the first leaf the little root appears. The white point springs out of the substance of a knob, opens into green leaves, and shoots out on the side a new point. But these several points, and the stalks they produce, are not all designed to bear fruit. Many of them wither and are lost. When the principal stem has taken growth, there is a considerable revolution in the plant, and all the sap is then employed in the formation of the blossoms and fruit. But before that, when the plant begins to vegetate, there are four, and sometimes

sometimes six leaves, which spring from so many knobs. They prepare the nutritive juice for the ear of corn, which is seen in miniature in spring, upon opening a stalk through the middle. Even in autumn this ear of corn may be seen, in the form of a little cluster, when the knobs are still very close together. When the plant begins to bud, the two upper leaves of the stalk join together, inclose the ear of corn, and protect it, till it has acquired some consistency. Before that happen, all the knobs, and particularly the two last, though soft, are very closely connected, and very little space between them. But as soon as the ear of corn has pierced through its coats, all its parts lengthen, and the leaves give them all the juices they contain. By degrees the knobs harden, and the under leaves dry up; and the juices which nourished them are no longer used but in strengthening the stem. After all these preparations the blossom appears. This blossom is a little white stalk, extremely slender, which comes from the juice of the grain. Several other little stalks surround it. They are at first yellowish, afterwards, they grow brown, and at last become blackish, a little before they fade and fall off. The chief use of these stalks is to nourish a little cluster, which is in the bag of grains. As soon as the corn has done blossoming, there appear grains, which contain the germ, and which come to perfection long before the mealy substance appears. This substance gradually multiplies, while the sap collects round a part extremely fine and delicate, like down. This down, which exists longer than the blossoms, serves, among other things, to support the opening of the principal pipe that goes through the corn. The fruit ripens as soon as it has attained its full growth.

growth. Then the stalks and the ear whiten, and the greenish colour of the grains become yellow or dark brown. These grains are still, however, very soft, and their meal contains much moisture; but when the wheat is quite ripe, it becomes dry and hard. The wisdom which appears in the construction and vegetation of corn, will appear even in the smallest blade. The leaves, for example, which surround it, before it has attained its full growth, even those leaves have their use; and it seems as if the wisdom of the Creator had placed them round the blade, for the same reason that an architect raises a scaffolding about a building, which, when the building is finished, he takes away. For as soon as the blade has attained its full length and consistency, the leaves which protected it dry up and fall off. Whole months pass away, before the ear of corn ventures to appear and expose itself to the air; but as soon as every thing is prepared for the formation of the blossoms and fruit, they all appear in a few days. With what skill also are the stalks and the ear of corn constructed! If the former were higher, the nutritive juice could not so well penetrate into them; if, on the contrary, the corn had been placed lower, the moisture would have made it spring up before it was reaped; birds and other animals would get at and destroy it. If the stem was weaker and smaller, the wind would break it; and if it was stronger and thicker, little animals might lodge in it, birds would perch upon it, and pick out the grain.

Merciful and beneficent Father! may all those who behold a field of wheat, and contemplate with pleasure the waving corn, may they experience

rience all the sentiments of love and admiration which thy goodness ought naturally to excite.

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AUGUST III.

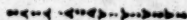
THE DOG DAYS.

THE sun, besides its diurnal motion, which appears to convey it from east to west, and which occasions the revolution of day and night, seems evidently to have another motion from west to east; by means of which, at the end of 365 days, it comes again near the same stars from which it had removed for six months, and to which it was drawing near the other six months. On this account, the ancient astronomers divided the seasons according to the stars which the sun meets in its annual course. They divided this course into twelve constellations, which are the twelve signs of the zodiac, called the twelve houses of the sun, because it seems to dwell a month in each of them. The summer begins with us when the sun enters the sign Cancer, which happens the 21st or 22d of June. It is then that the sun is raised at the highest above our horizon, and darts its rays almost directly upon us; and, of course, at that time begins the heat of summer, which always increases in the following month, by degrees, as our globe is more heated by the burning rays of the sun. This is the reason that July and part of August is generally the hottest part of the year; and experience has proved, that from the 20th of July to the 10th of August, the heat is at the height. Now, of all the stars in conjunction with the sun, the dog-star is the brightest.

brightest. Lost in the rays of the sun, it disappears from us for a month, as is the case with every star which the sun meets in its course, and the month of its disappearing is the time of the dog-days. These observations would be of little importance, were it not to remove a rooted prejudice among many people. An ancient tradition attributes the heat usually felt at this time to the influence of the dog-star upon the earth and its inhabitants. This opinion is proved to be absurd, from this circumstance alone, that the concealment of the dog-star, in the rays of the sun, does not take place in the time we call dog-days. Those days, properly speaking, do not in reality begin till the end of August, and they terminate towards the 20th of September. And as the dog-star, or the *sirius*, always advances farther, it will attain in time to the months of October and November. It will at last be found to fall in the month of January, and we shall then, in the dog-days, experience severe cold. When we reflect on this, we may plainly see, that it is impossible this star should occasion the great heats which we suffer, or the effects they produce.—When, therefore, in the supposed dog-days, the wine or beer spoils in bad cellars; when things liable to ferment turn sour; when stagnated waters dry up as well as the springs; when dogs and other animals, and men also, are seized with madness; when we are attacked with disorders, which imprudence in hot weather draws upon us; this does not happen because a star conceals itself behind the sun. It is the extreme heat of the air, at that season, which is the sole cause of all those effects. Whoever can suppose, that certain figures, which the imagination forms to itself in the sky, can have any influence on

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our globe, and on the health and reason of man, discovers great want of judgement. It is not the stars, it is generally ourselves, which we ought to accuse of the evils we suffer. If then there should be at those seasons dangerous maladies, let us not impute them to the influence of the dog-star, which is entirely chimerical! Let us rather believe they proceed from our misconduct and neglect. If we consider the point seriously, we sin against a wise Providence, by indulging such prejudices. Can we suppose an infinitely good Being, the Ruler of the world, to have created any thing in the heavens, or in the earth, to be a torment and misery to his creatures? If we believe in such as an inevitable fatality, we cannot admit or acknowledge a Creator, the essence of wisdom and goodness. Instead of being guilty of such an error, let us glorify God, and secure our peace, by believing ourselves to be under the protection of a merciful Father, contrary to whose will not even a hair can fall from our heads.



AUGUST IV.

SLEEP.

WE fall asleep more or less quickly according to the constitution and state of health. But be it quick or slow, it is certain it comes always in the same manner, and the circumstances which precede it are the same in all men. The first thing which happens when we are falling asleep is a stupefaction of the senses, which, no longer receiving exterior impressions, slacken and gradually

dually become inactive. From thence the attention fails and is lost ; the memory is confused ; the passions are calm ; the train of thought and reasoning becomes irregular. When we perceive sleep coming, it is but the first step, it is not yet sleep. It is but dozing. When quite asleep, we have no longer that consciousness, that fixed idea of ourselves, which requires memory. To the stupefaction of the senses is soon added a stiffness of the muscles. This is the second degree towards sleep. This state produces several symptoms in the machine, which may be observed in those who sleep in a chair. The eyes wink, open, and shut of themselves ; the eye-lids fall down ; the head totters, and falls forward : We endeavour to support it, but it falls still lower down, and we have no longer strength to raise it up. The chin rests on the bosom, and we sleep quietly in this attitude. If our sleep is sound, all voluntary or animal functions are suspended, but the natural or vital functions are performed with the more force. This is the third change which sleep occasions in us. Digestion is better carried on while we sleep. When awake, the natural motions are sometimes interrupted by the voluntary, and the fluids are quickened in some vessels, and retarded in others. The blood is wasted in external actions, and consequently does not flow through the internal parts so abundantly. The circulation of our blood is very strong in those parts of our bodies which are in motion ; and it is continually pressing the humours in the secretory vessels ; whilst, on the contrary, it is so weak in the others, that the chyle can scarcely turn into blood. A sweet sleep restores the balance every where. The vessels are equally open ; the juices flow uniformly ;
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the warmth is preserved in the same degree. In a word, nothing is lost, and all contributes to the good of the machine. From these circumstances it is, that, after a sound sleep, we are rested, refreshed, active, and strong. Will not these reflections make us sensible of God's goodness towards us? What preparation, what tender care, to procure us the blessings of sleep! It particularly deserves our grateful attention, that sleep is attended with an entire heaviness of the senses, and seizes us unawares, without being able to avoid it. The first of these circumstances makes it more sound and refreshing: the second makes it an inevitable necessity. And what admirable wisdom of Providence in the regulation of the muscles during sleep. The first which grows stiff is intended to guard one of our most precious organs, and that which is most exposed to danger, the eye. As soon as we grow sleepy, the eye-lid closes of itself, covers and protects the eye till we awaken. In other parts of the body, the muscles contract with more force, because their being relaxed might be dangerous and inconvenient. Let, then, the hours in which we are disposed to enjoy the sweets of sleep, be ever a time of gratitude towards our heavenly Father. Let us bless him, not only for the days happily succeeding one another, but for having so formed us, that sleep refreshes and strengthens us. Let us fall asleep with these thoughts, and let them be the first that come into our minds when we awake.

AUGUST V.

DIVISIBILITY OF BODIES.

WE may easily be convinced of the infinite divisibility of bodies, by the perfumes which the plants and flowers exhale. How inconceivably small must the fragrant corpuscles of a carnation be, which spreads over a whole garden ! If this is not a sufficient instance, let us consider other objects in nature ; let us cast our eyes on a silk thread, the work of a poor worm. Let this thread be 360 feet long, and yet it will weigh no more than a grain, that is to say, the seventy-second part of a drachm. Let us next consider, into how many parts a length of 360 feet may be divided, even so as to have each part perceptible. An inch may be divided into 600 equal parts, each of which is the thickness of a child's hair, and consequently visible to the naked eye. Of course, a single grain of silk contains at least 2,592,000 parts, each of which is visible without a microscope. And as those same parts may still be divided into several more millions of other parts, a division which may be continued always farther by thought, it is evident that this progression may extend to infinity. The last particles, which cannot be separated by human industry, might still, however, have extent, and consequently, are capable of division, although it cannot be done in this world.

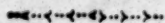
If we examine the animal creation, we shall discover fresh proofs of the infinite divisibility of matter. A great naturalist put pepper into a glass of water, and by means of a microscope, he discovered in that water a multitude of animalcula, which

which were a thousand million of times smaller than a grain of sand. How inconceivably small, then, must be the feet, the organs of sense, the muscles, the veins, and nerves of such animalcula? What must their eggs be, their young, the limbs of the young ones, their vessels, and the juices which circulate in them. Here our imagination is lost, our ideas are confounded; and yet nothing is more certain than what is said here. It is particularly worth observation, that the more we magnify, by the assistance of glasses, the works of nature, the more regular and beautiful they appear; while it is quite different in respect to those of art: For when they are examined through a microscope, we are astonished to find them so coarse, so rough and uneven, although they have been done with all imaginable care, by the best workmen. Thus God has impressed, even on the smallest atom, an image of his infinity. The most subtle body is as a world, in which millions of parts are met together, and arranged in the most perfect order. What astonishing wisdom is that which, in the little as well as the great, can operate with so much regularity and perfection! How great that power which could draw out of nothing such an infinite multitude of all sorts of beings!

O God! how forcibly ought these reflections to make us feel the limits of our understanding! The least worm, the least insect, the least dust, may convince us, that there are a million and a million of things of which we are ignorant, and cannot explain. Try, O man! to enumerate the parts of which the body of an animalcule is composed, and which is a million of times smaller than a grain of sand. Undertake to decide that degree of subtilty of one of those rays of light,
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several millions of which can pass through a hole no larger than the eye of a needle. Thou wilt soon be lost in thy ideas, and thou wilt be obliged to acknowledge thy ignorance and thy limited understanding. How canst thou, then, be vain of thy knowledge ! how canst thou presume to blame the ways of the Lord, and find fault with the plan he has formed ! Canst thou flatter thyself thou knowest the millionth part of the beings which exist ! Is it not here our duty, our glory, even to acknowledge our ignorance, and the infinite greatness of God !

Let us make this use of these meditations: Let us only reflect on the infinite divisibility of bodies, in order to feel the more forcibly the greatness of God, and our own littleness. This will also give us reason to admire the wisdom of the Creator : For, by means of the infinite subtilty of matter, all the voids are filled up, without interrupting motion, and the universe presents us a scene continually varying.



AUGUST VI.

OUTWARD CONSTRUCTION OF THE LIMBS
OF INSECTS.

WE judge, in general, no animals worth our attention, but those that are distinguished by their size. The horse, the elephant, the bull, and such creatures, appear to us worth looking at, while we disdain to cast our eyes on the innumerable swarm of little animals which people the air, the vegetables, and the dust. How many insects do we tread under our feet ! How many caterpillars

lars we destroy ! How many flies buzz around us, without in the least exciting our curiosity ! Nothing is more unreasonable than such inattention ; for it is certain, that the wisdom and power of our Creator is no less manifest in the construction of a worm, a snail, &c. than in that of an elephant, a horse, or a lion. The body of most insects is composed of several rings, which link one within another, and have a part in all the motions of the animal. The essential character which distinguishes insects is, that, properly speaking, they have no bones. Even in this circumstance of their formation, much wisdom is shewn. The motions adapted to insects, the manner in which they are obliged to seek food, and particularly the many transformations they go through, could not be so easily performed, if, instead of these moveable rings which go to and fro, their bodies were connected and fastened by bones. It is observable in several insects, that they have the power to contract or enlarge their head, to lengthen or to shorten it, to conceal or to shew it, just as they please, and as their different situations require. The mouth of insects is generally provided with a sort of teeth or a trunk. This is necessary, both on account of their food, and the different pursuits they are exposed to. Many insects are blind, but they are made amends by the touch, or some other sense. Insects have two sorts of eyes. Those which are smooth and bright, are in small numbers ; but the net-work eyes, like shagreen, and the cornea of which is cut faucet-ways, are very numerous. There are sometimes thousands of them. Neither of these are moveable, but their number and position supply that defect. The horns which most insects are furnished with are of great use to them.—

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These sort of horns, by going before the body, and feeling out their way, not only warn the animal of the dangers with which it is threatened, but are a means to discover their proper food.—The legs of insects are either scaly or membranous. The former move by means of many joints; and the latter, which are more simple, move every way. Sometimes the same animal has both these sort of legs. There are insects which have several hundred feet, without going faster than those who have but four. In regard to this part of the body, there is infinite variety among insects. With what art must the limbs of those be constructed which fasten on smooth and polished surfaces! How elastic must the legs of those be which leap! How strong must those be of the insects which dig in the ground!—Two or four wings are placed in the middle of the body. Some are as transparent as a thin gauze; others are scaly and mealy: Some are without covering; others are concealed in cases. At the sides, or the extremity of the body, there are orifices in the form of sloes, that are called prints. They are the organs of respiration. The variety observable in the construction and form of the limbs of insects is prodigious; and the lives of many men would not be long enough to observe and describe the different forms of these little animals. How varied are those of insects which walk, fly, leap, or crawl! And yet, however different their form may be, they are always in the same harmony and perfect proportion. Would it not be the height of extravagance and perverseness, not to acknowledge, in all this, the infinite wisdom of the Creator? We are only rational and virtuous, in proportion as we acknowledge God, and adore him in all things. Let us acquit our-

only the sense of feeling. Many have but two senses ; others have three ; and those which have five are reckoned among the most perfect. But even the most perfect of them have not always senses more exquisite than ours. Indians can judge by their smell how much alloy is mixed in precious metals, as well as we can by applying the touchstone to it ; others, we are told, can discover at a great distance the retreats of wild beasts. The inhabitants of the Antilla islands can distinguish, by the smell, whether a Frenchman or a Black has passed by. The savages are in some measure compensated for the weakness of their intellectual faculties by the quickness of their senses. Many people have exercised and improved certain senses to an astonishing degree ; and if mankind were like the animals, without other assistance besides their senses to procure food, and to guard them against dangers, if reason was not their surer and better guide, their senses, without doubt, would have acquired the highest degree of perfection by exercising them to advantage. But, in reality, man does not require senses more exquisite than he possesses : reason compensates an hundred fold for some privileges which certain animals appear to have over him. We may even be assured, that if our senses were more keen, it would be very inconvenient to us. Let us, for example, consider hearing. If we had this sense as quick as the safety of animals requires theirs to be, even the most distant noise, and the stunning din of mixed sounds, would continually interrupt our meditations, our repose, and our noblest employments.

Thanks to the infinite wisdom of the Creator, which has so measured the quickness of our senses, that it is enough to enjoy fully the blessings
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of nature, without disturbing the noblest occupations of human reason. Our senses being limited is an advantage rather than a loss to us, a perfection rather than an imperfection. Happy the man who allows his reason to govern his senses, and who enjoys all the advantages which must result from a perfect harmony between both.

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AUGUST VIII.

THUNDER.

THE thunder roars, O mortal man ! Who is it that causes this terrible noise ? Who darteth the lightning from the clouds ? Behold, O sinner ! it is the Ruler of the world, it is the hand of the Most High which hurls the thunder-bolt. Nature rests in his hands, he preserves and blesses it : but at his all-mighty word, the heavens and the earth are consumed in flames. The thunder roars ! How dreadful is the stormy sky ! The lightning flashes ! The thunder-bolt is shot ! O God ! how great art thou, and how terrible is thy power ! The Lord, from his throne on high, darts angry looks upon us ; and by the light of his lightning we see the grave open under our feet. When the Lord sits in the clouds, men and heroes tremble. When he sharpeneth his anger against us the universe turns pale. God directs the thunder ; the sinner hears and shudders. Scarce does he dare to raise his eye towards him whose voice seems to threaten him. Christian, let not the majesty of thy God affright thy soul, when he sits in the stormy clouds, and darts his lightning. When the mighty sound of thunder terrifies the wicked man,
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thy God watches over thee, and guards thee from all danger. And though he should deprive thee of life, all his judgements are just : he is thy master, and thou wilt say unto him, Lord ! my soul is at peace ; whether I live or die, all my hope is in thee. He who, when the sky is serene, glorifies his God in songs of joy and gratitude, is calm and easy when the sinner flies at the sight of dark clouds. But where can the sinner fly ? Can he escape from the Most High ? In vain he would hide himself ? the lightning pursues him, and reaches even to the darkest recess. Fly not then, O sinner ; think not that thou canst hide thyself from the sight of the Creator, who follows thee every where, and can every moment seize thee. When the thunder roars, thou tremblest, and strikest thy breast ; when the storm ceases, thou again runnest after false pleasures. Sinner, if thou wouldst obtain mercy, bless the Lord for his goodness toward thee. Forget not the vows thou madest in thy anguish and fright : consider that God is not to be mocked. God is merciful, and spareth the rebellious, but he does not spare for ever. The Lord is just, and the Supreme Judge will call the sinner to account. What is the thunder roaring over our heads, in comparison of that solemn day, when we shall hear the sound of a storm in which the elements themselves will be dissolved.

AUGUST IX.

CONTEMPLATION OF A MEADOW.

DARK and majestic woods, where the fir-tree raises its stately head, where the tufted oaks spread their shade ; ye rivers which roll your silver waves through the grey mountains, it is not you I now mean to praise : It is the verdure and enamel of the fields which are now the objects of my contemplation. How many beauties present themselves to the sight, and how varied are they ! Millions of vegetables, millions of live creatures ! Some flying from flower to flower, while others creep and crawl in the dark labyrinths of the tufted grass. All these insects, so infinitely varied in form and beauty, find food and happiness here. All inhabit this earth as we do : and however contemptible they may be in our eyes, they are all perfect in their kind.—How soft the murmur of the limpid stream, whose banks are covered with thick grass, intermixed with flowers, which, bending over the water, trace their image in it. Behold that forest of waving herbs ! What a mild lustre the sun casts on those different shades of green. Those delicate plants, interwoven with the grass, thus mix their tender foliage, or else proudly raise their heads above their companions, and display flowers without perfume ; whilst the humble violet grows on barren hills, exhaling its sweets around. Thus one often sees the useful virtuous man in poverty, whilst the rich and great are clothed in sumptuous habits, wasting in idleness the blessings of the earth. Winged insects pursue each other in the grass. Sometimes I lose sight

sight of them in the verdure, and then again I see a swarm of them flying in the air, and sporting in the rays of the sun. What is that gaudy flower waving near the brook? How lively its colours! How beautiful! I draw near it, and laugh at my mistake: A butterfly flies off, and leaves the blade of grass which bent under its weight. In another place I perceive an insect clothed in a black cuirass, and adorned with bright wings. It comes buzzing to rest upon a blue-bell, perhaps by the side of its companion. What other buzzing is this I hear? Why do those flowers so bend their heads? It is a swarm of young bees. They have lightly flown from their distant home, and dispersed over the gardens and fields. They are now gathering sweet nectar from the flowers, in order to carry it to their cells. There is not an idle one amongst them. They fly from flower to flower; and, in seeking their stores, they conceal their velvet heads in the cup of the flower, or else with labour penetrate into those that are not yet unfolded, and which afterwards incloses the bee. There, on that high clover, is perched a butterfly. He shakes his gaudy wings, he settles the shining feathers which adorn his head, and seems proud of his charms. Beautiful butterfly! make the flower bend, which serves thee for a throne, and contemplate thy rich dress in the mirror of the water. Then wilt thou resemble a young beauty admiring herself in the glass which reflects her charms. Her clothes are less beautiful than thy wings, and her thoughts are as light as thee. Behold this little worm playing on the grass! No researches of luxury, no human art could imitate the green and gold which cover its wings, wherein all the colours of the rainbow

are mixed. O how beautiful is nature ! The grass and flowers grow luxurious ; the trees are covered with foliage ; the gentle zephyr salutes us ; the flocks seek their pasture ; the tender bleating lambs skip and rejoice in their existence ; millions of points of grass rise up in this field, and to each point hangs a drop of dew. How many primroses with their trembling leaves are here ! What harmony in the notes of the nightingale from yonder hill ! Every thing expresses joy. Every thing inspires it. It reigns in the hills and dales, in woods, and in groves. O how beautiful is nature ! Yes : Nature is beautiful even in the least of its productions ! and whoever can be insensible to its charms becomes a prey to tumultuous desires, pursues false blessings, and deprives himself of the purest pleasures. Happy he whose innocent life passes away in the enjoyment of the beauties of nature ! The whole creation smiles upon him, and joy attends him wherever he goes, and under whatever shade he reposes. Pleasure springs out of every source, exhales from each flower, and resounds in every grove. Happy he who takes pleasure in innocent delights : His mind is serene as a calm summer-day. His affections are gentle and pure as the perfume of the flowers around him. Happy he who, in the beauties of nature, traces the Creator, and devotes himself wholly to him !

AUGUST

AUGUST X.

MISCHIEF OCCASIONED BY ANIMALS.

IT is grievous to see many productions of nature, and often some of the most beautiful of them, liable to be destroyed by animals. Summer can never pass over without perceiving (particularly among the vegetables) what mischief is done by the voracity of different sorts of birds, insects, &c. How many trees are destroyed, and fruits consumed, by worms and caterpillars! How many things necessary for our subsistence are we not deprived of by the insatiable sparrow, and the no less ravenous raven! How sad is it to see a field destroyed by rats and locusts! These and such like complaints are often made; and people fancy that certain animals exist only to torment mankind. There is some foundation for these complaints, and it cannot be denied that insects cause much mischief. It is easier to exterminate wolves, lions, and other wild beasts, than to extirpate insects, when they swarm over a whole country. At Peru, a sort of ant called *chako* is a real plague to the inhabitants. Their lives would even be in danger, if they did not use precautions to deliver themselves from these dreadful insects. It is well known what caterpillars do to fruit trees, and mice to the fields. But however real these inconveniences may be, they do not authorise such bitter complaints as we allow ourselves to make; complaints in which self-love has too great a part. We are pleased at observing that the creatures hurtful to us destroy one another. We think we have a right to take away the lives of animals, either for our

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food,

food, or for any other purpose ; but cannot bear that they should take any thing from us. We expect they should serve for our subsistence, and will give up nothing to them. In reality, however, have we more right over the life of a gnat, than it has to a drop of our blood ? Besides, in complaining of the voracity of animals ; we do not consider that this plan of nature is not so disadvantageous as it appears. In order to be convinced of this, we have only to consider the animal kingdom in the whole. Such a species, which appears noxious, is, however, of real use ; and it would be very dangerous to attempt to destroy the race of them. A few years ago, some inhabitants of the English colonies in America endeavoured to extirpate the jays, or jackdaws, because they fancied that these birds did much mischief to the corn ; but in proportion as the number of jays diminished, the people were struck with the havock made by an enormous multitude of worms, caterpillars, and particularly the May-bugs. They soon ceased to persecute the jays ; and as soon as those multiplied again, they put an end to this plague which had been the consequence of their destruction. Some time ago a project was formed in Sweden to destroy the crows ; but they were observed in time not only to fix on corn and plants, but also that they devoured the worms and caterpillars, which destroy the leaves or roots of vegetables. In North America they pursued the sparrow violently ; but it happened from thence that the gnats increased to such a degree in the marshy countries, that they were obliged to leave a great deal of land uncultivated. Pheasant-hunting is so considerable in the isle of Porcido, that it occasioned the king of Naples to forbid the use of cats to the
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the inhabitants. At the end of a few years the rats and mice increased so much, and did such mischief, that this order was abolished. And why should we be so selfish as to envy creatures the small part of our provisions which they require for food? Could we possibly consume all that nature produces? Shall we want any thing for our support or pleasure, because the birds, the mice, and the insects, help us to make use of the blessings which God grants in such profusion, and part of which would be wasted were not the animals to feed on it. Instead of giving way to unjust complaints, let us rather in this, acknowledge the wisdom of our Creator. Every thing in nature is connected together. No creature is useless, or placed without design, although the use of many animals is unknown to us. It is enough that they exist; we may be certain that it is for the wisest purposes. Thus the seeing the apparent destruction and disorders in nature ought to make us look up to a God, who has created nothing in vain; who preserves nothing without a reason; and who, if he permits any thing to be destroyed, does it not without a wise design. If we are thoroughly convinced of these truths, all the works of God will lead us to glorify and bless him.

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AUGUST XI.

VARIETY OF COLOURS.

WHEN we consider how dull and melancholy the country would be, and how confused all objects would appear if they were of one colour only, we must acknowledge the wisdom and goodness

ness of God, who, by variety of shades and colours, meant to increase and vary our pleasures on earth. If he had not designed to place us in an agreeable situation, why should every place around us be adorned with such a variety of beautiful painting? The sky and all the objects seen at a distance are painted in the great style. Splendour and magnificence are their characteristics. Lightness, delicacy, and the minute graces, appear in the objects designed to be seen near, such as foliage, birds, flowers, &c.

But from whence proceeds the distinction of colours? Each ray of light appears to be simple; but, by refraction, it divides into several; and it is from hence that colours arise. A glass of water laid in the sun reflects certain colours on white paper. Angular glass well cut and polished, casts still more lively colours. But we should see the finest rainbow close to us if we turn a prism towards the sun, or if, with the prism (or triangular glass), we receive a ray, entering by a little hole into a close shut room.—The colours are in proportion more or less bright, according as the refraction of rays is more or less strong. The most refrangible ray is the violet, and consequently it is the weakest. Afterwards come lower the indigo, blue, green, yellow, orange, and the red, which of all the rays is least refrangible. The nature also of the coloured bodies contributes to the variety of colours. The smallest parts in almost all bodies are transparent. This is the cause of their breaking, absorbing, or reflecting rays, sometimes one way, and sometimes another, as the angular glasses do. What shews besides, that colours are not inherent in coloured bodies, is, that the neck and feathers of a pigeon or peacock, and even the stuffs called changeable taffeties,

taffeties, silk, &c. all change colour according to their position. This may make us comprehend from whence proceeds the variety of colours. The whole is comprised in this, that the surface of bodies is composed of extreme small flakes, which, according to their different thicknesses, reflect some coloured rays, while they admit or absorb others in their pores. Thus, when a body, whose surface is smooth, reflects and throws out almost all the rays of light, it appears *white*; and when, on the contrary, it absorbs them, it is *black*. Let us in this admire the wisdom and goodness of God. If the rays did not divide, and were not differently coloured, every thing would be alike, and we could only distinguish objects by reasoning, and by circumstances of time and place.—How tedious and perplexed would it be, if we were every instant to distinguish one thing from another by reasoning. Our whole lives would be taken up in studying rather than in acting, and we should be for ever in a state of uncertainty. If there was but one colour in the world, our eyes would soon be tired, and this dull uniformity would give us more disgust than pleasure. The different colours God has ordained serve to spread more beauty on the earth, and to afford pleasures ever new to the eye. It is still another proof, that God, in the formation of the world, not only considered the essential perfection of his works, but adorned them also with every thing which would enhance their value. In the mixture, and the several shades of colours, the useful and the beautiful are ever united. As far as our sight can reach, we always discover new charms in the fields, the valleys, and the hills. All contribute to give us pleasure, and all ought to excite our gratitude.

AUGUST XII.

THE BUILDINGS OF THE BEAVERS.

IF a man, who had never heard of the beaver's manner of building, had been shewn some of their edifices, he would certainly have supposed them the work of skilful architects. The whole performance of these amphibious creatures is wonderful. The regularity of the plan, the size, the solidity, and the admirable contrivance of their buildings, must fill every attentive observer with astonishment. The beavers choose a place to build on where they can have plenty of provisions, and near a rivulet, in order to have a reservoir of water to bathe in. They begin by making a dike or bank which keeps the water on a level with the first floor of their house.—The bank is sometimes a prodigious work. It is about ten or twelve feet thick at bottom. It goes sloping, and insensibly diminishing, towards the top, till it becomes no more than two feet. The only materials for this dike are wood and clay. The beavers cut pieces of wood as thick as an arm, with wonderful ease. They fix these upright down into the ground, very close to each other, and interweave between smaller and more supple pieces of wood. But as the water would get through, and their watering-place would be empty, they have recourse to clay or potters earth, which they know where to find, and with which they fill all the spaces within and without, so that the water cannot run through. In proportion as the water rises, they continue to raise the dike. The bank of the watering-place being finished, they labour at their houses, which
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are round or oval buildings, divided into three stories, raised one above another: One of them is below the dike, and generally full of water; the other two are above it. They fix these little buildings in a very strong and firm manner on the edge of their watering-place, and always by stories, in order to mount higher, in case the water should rise. If they find a little island near the watering-place, they build their house upon it, which is then more solid, and they are less incommoded by water, in which they cannot long remain. If they do not find this convenience, they, with the help of their teeth, put piles or stakes into the ground, in order to support the building, and preserve it from the wind and water. They make two doors at the bottom to go out into the water. One leads them to their bathing-place; the other is a passage to the place where they carry all the dirt, &c. from their upper apartments. They have a third door, higher up, for fear of being taken when the ice stops up the lower doors. They sometimes build their houses entirely on dry ground, and make ditches five or six feet deep, to get to the water. They use the same industry, and the same materials, for the buildings as for the dikes. The walls are perpendicular, and two feet thick.— They cut off with their teeth the ends of wood which go beyond the level of the wall, then, mixing clay with dry herbs, they make a composition of it, with which they plaster both inside and outside of the work, by the help of their tail. The inside of the house is arched; and the size is in proportion to the number of inhabitants. —Twelve feet long, by eight or ten feet wide, serves for eight or ten beavers. If the number is greater, they enlarge the building in proportion.

tion. The instruments the beavers employ are four strong and sharp teeth; two fore feet, the claws of which are divided; two hind feet, with membranes, or webbed; and a tail covered with scales, formed like an oblong trowel. With these few utensils, they shame our masons and carpenters, provided as they are with trowels, squares, and hatchets. With their teeth they cut all the wood they require for building; they make use of their fore feet to dig the ground, and to soften and mix the clay; their tail supplies the place of a wheel-barrow to carry their mortar or clay, and afterwards serves as a trowel to plaster it on.

The works of the beaver have, then, the greatest resemblance to those of man; and if we were to judge by the first impression they make upon us, we should think them rational, and acting from reflection. But if they were capable of reflecting, they would build differently now from what they did formerly; they would continually improve: But they have always followed the same method, and have never gone out of the line Nature prescribed them. Thus, the beavers now build exactly the same houses they built before the deluge. But this does not render them unworthy of our attention and admiration, as of all animals we know they come the nearest to human reason. We need only observe them, to be convinced that beasts are not mere machines, but that all their actions and motions are directed by a higher principle. Yet, what infinite difference has the Creator placed between them in their faculties! How much superior is the instinct of the beaver to that of the sheep! and what divine wisdom is shewn in these degrees, by which the brute creation insensibly

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ANIMALS CONSIDERED AS EXAMPLES TO MAN-
KIND OF VICES AND VIRTUES.

THE study of animated nature furnishes us with many pleasing ideas, especially as it gives us every where proofs of the divine wisdom and goodness ; but I do not know whether we attend as much as we ought to the lessons of morality it seems intended to convey. Had man continued in a state of innocence, he must still, I should suppose, have been capable of improvement. Life would have been to him a state not only of trial, but of instruction ; and it is natural to believe, that the animals, which it pleased his Creator to bring before him (that, seeing their different dispositions, he might learn to call them by suitable names), were intended to be his instructors, as to the difference between good and evil, which in himself he would not have experienced, if he had never sinned. If, from the apparent sufferings of some animals, and the seeming cruelty, tyranny, and oppression, exercised by others, and from the various exertions of the tender, as well as of the violent passions which we may observe in the brute creation, man was to learn to hate the one, and love the other,—a reason why things are so (at least with regard to ourselves) must be

be allowed. It is remarkable that compassion belongs to man alone. It is spoken of God in a metaphorical sense; for we cannot suppose the Deity to suffer with his creatures, as we do for each other. In God is mercy, mercy free and infinite; in man, compassion for all created beings. In the brute creation some few instances of affection are found; no compassion properly so called; no free disinterested pity. Some virtues, the brute creatures, especially the domestic animals, may teach us; and doubtless they were intended to do so. The innocent lamb, in a language more powerful than words, instructs us to practise the gentle meek arts of persuasion. The obedient ox and cow inculcate mild submission. The ass is an example of patience; the generous horse of activity and aptness to receive instruction. The goat teaches us to value liberty. The dog is an example of fidelity and kind attention; the cat of various domestic virtues.—Friendship seems unknown, or but faintly expressed, amongst animals, excepting dogs and horses; and in them it is chiefly towards man. Nor is conjugal affection observable, except in the feathered race; among whom the common dung-hill cock is distinguished by his preference of his wives to himself in the circumstance of food; also the singing birds in their attendance on the hen, whose cares the cock shares, or at least endeavours to alleviate. But the shining quality in animals is parental affection, at least in the female sex. The vices which the dumb animals teach us to avoid are much greater, and more in number, than their virtues. The gluttony, sloth, and filth of the hog, we detest. The dog, when fawning on his oppressor, is an object of contempt. The camel, though useful, seems framed
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for slavery. The pride and ill-nature of the peacock we dislike as much as his voice. The turkey is a pattern of all the vices in man; and is an exception, as well as the hog, to the moral character of the domestic beasts and birds. The elephant is in many things admirable; but his base concurrence towards enslaving his fellows, his submitting to be the executioner of tyranny in destroying criminals, and his mad rage on many occasions, cancel all his pretensions to reason.

Though what is here mentioned may be stiled common place, yet so long as mankind are inattentive, such things may properly be pointed out, and much more might be said. The beaver, if contrasted with that horrible creature called the glutton, the bee with the wasp, the ant with the flesh-fly, would teach us, as well as the domestic animals, to do good, and avoid evil. But the subject is almost inexhaustible. I will therefore conclude with a part of the creation more numerous perhaps than all the rest put together; I mean the fish, both those with scales, and those which have shells, but all of the oviparous kind; for the viviparous are like the quadrupeds as to their moral endowments. They seem to travel in vast bodies, not from any love of society, but merely because they are born in the same or in neighbouring situations, and live on the same food, which they find near the coasts where they themselves are to feed us. They are driven in by the large fish which prey upon them, but which they seem neither to fear nor to hate. Conjugal and parental love do not exist among them, any more than friendship or compassion. Vanity, pride, envy, or hatred, they are strangers to. If any passion, beyond an appetite for food, exists among these, or the various kinds of shell-fish, it can only be conjectured

conjectured from the circumstance of lobsters sometimes wanting a claw, from which we suppose they fight ; but it may not be so. Fish want no assistance from man ; nor do they by their actions call for it ; nor have they any sound, as far as we know, whereby to express sorrow or joy. Appetite for food will tame a carp ; and it once produced a learned fish : but these are the only proofs of any capacity for improvement. Perhaps the lively motions of the small fry, and of the golden fish, which give us an idea of joy, are merely owing to their eagerness for prey. Fish, then, seem to be absolutely void of reason. Removed from the sight of man, they can only instruct the attentive inquisitive mind. Such they may teach to despise a state of mute insensibility, and to be thankful for the pleasing sensations man enjoys from a due exertion of his passions, and for that religion which teaches him to know how to govern them. It may also check the pride of man, to reflect, that so large a portion of animated nature as that which the waters contain, is made wholly independent of him as to food and enjoyment ; and that, when degenerated into a savage state, he is himself reduced to seek a maintenance from them : the last resource of a kind Providence to supply the want and misery which sloth and inattention have brought upon the human race.

AUGUST

AUGUST XIV.

NATURE SEEN AND CONSIDERED IN DIFFERENT
POINTS OF VIEW.

THE works of nature, so superior in every way to those of art, are particularly distinguished by that admirable variety which continually affords us new sources of pleasure and surprise. We look once or twice at a work of art ; and if we do return to it again, we at last grow tired, and see it with perfect indifference. But when we attentively examine and reflect on the works of nature, we are never tired of them. They fill our minds ever with new delight ; and we are lost in contemplation. Let us first consider nature in its most sublime point of view. With what astonishment shall we not be struck, in beholding the immensity of the heavens, the inconceivable number of stars, and the vast extent of the sea. Compared to these, how small and trifling must appear all works of art, however great and excellent they may be ! All that God creates, or does, is stamped with a greatness which surpasses all our ideas and conception. To give us an idea of his infinity, he had only to form the starry sky. This displays the magnificent greatness of the Creator, more than all that the earth contains. Is there any thing so adapted to inspire us with the profoundest veneration for God, as the contemplation of these great works ! With what awe, what religious dread, ought we not to be inspired on beholding these great phenomena of nature which no mortal could produce, earthquakes, volcanos, inundations, storms, and tempests ! These great scenes of nature are sometimes before us ; and
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there are none of them which ought not to make us feel the majesty and greatness of the Creator of heaven and earth. Nature also presents itself in the pleasing point of view. We behold valleys adorned with verdure and beautiful flowers, fields promising rich harvests, hills covered with trees, vines, all sorts of simples and salutary plants.— In all those cheerful scenes, God appears as the friend and benefactor of mankind, who openeth his hand, and filleth all things living with plenteousness. This is the season in which all nature furnishes striking proofs of it. Every thing combines to please and flatter our senses, to support and rejoice us. But the time will soon come, when nature will appear under a sad and gloomy form. It will lose much of its beauty and variety. It will resemble a desert which promises neither riches nor pleasure. Each day draws us nearer to that gloomy season; and the insensible decrease of the days already warn us, that we must soon confine ourselves to our apartments. But nature ought still to please us even under this form; for the winter also has its share in the perfection of the world; and without it we should lose the pleasures of spring and summer. Let us apply all these reflections to our own lives: they are equally liable to variation; they change form continually. To the finest and most cheerful scenes, there often succeed the most dull and melancholy. Let us, therefore, when in prosperity, prepare ourselves for adversity; and let us bless God in every situation of life.

AUGUST

AUGUST XV.

MISCHIEFS WHICH RAINS MAY OCCASION.

MODERATE rain always contributes to the fertility and growth of plants; consequently it is an inestimable blessing to the earth. But in many respects rain may become hurtful to vegetables, when it falls too heavily, or lasts too long. When it is too violent, it beats delicate plants into the ground; and if it continues too long, it prevents their growth. An excessive wet deprives them of the necessary heat; the circulation of the sap is interrupted; the secretions do not operate properly; the plants languish, and are in danger of perishing. But though these are the most common ways in which rain becomes hurtful, they are not the worst. It sometimes makes sad havock, when several clouds, drove by impetuous winds, meet towers, mountains, and other high places in their way; they burst, and all at once discharge the water with which they were filled. This is called cloud-cataracts. This must necessarily do great mischief; for water not being compressible, must, when pressed down, burst suddenly, and flow with great violence from mountains or great heights. It is not wonderful it should then sweep away large stones, tear up trees, and throw down buildings; for two causes combine to render its effects more violent: On the one hand, its quantity, and on the other, its swiftness, increased by the height from which it falls; the action of a body which moves being always in proportion to its mass and its velocity. The water-spouts are still more formidable; they are shaped like a pillar, or cone, with the point towards

towards the ground, and the base joining to a cloud. These water-spouts attract and draw up every thing they meet in their way; which is dashed down again with the water most violently. If the point of the pyramid touches the sea, the water boils up, foams, and rises with a terrible noise; but, if it falls on ships or buildings, it shatters and throws the latter down, and very often sinks the others. In all probability, this meteor is occasioned by the wind blowing different ways, and meeting several clouds, which they drive violently against each other. When these different winds strike the clouds on the side, they of course occasion their turning round rapidly; and, in this circular motion, they take the form of a whirlwind; and their weight being suddenly increased by the force of pressure, they fall down impetuously; and in their fall, they take the form of a column; sometimes conic, sometimes cylindrical, turning rapidly round about. Their violence is in proportion to the quantity of water which falls altogether, and to the velocity of its fall. Cataracts and water-spouts are always dangerous. Happily the latter are very rare on land; but they are more frequent at sea. As to the cloud-cataracts, the mountainous countries are more exposed to them than the flat countries; and they happen so seldom, that many years pass without an acre of ground being destroyed by them. However this may be, it is wrong to murmur when these disasters happen. Many people are greatly affected by these events; they look upon them as most fatal, and their imagination multiplies and magnifies objects. When a little corner of the earth (which, in comparison of our globe, is a mere speck) happens to be laid waste by a water-spout, or by any such accident, we complain

complain, as if all nature was in danger of perishing ; and, quite full of these local transient evils, we forget the blessings, without number, which God dispenses over all the earth, and which must exceed the chastisement he sends from time to time. If we were just, we should be much more sensible of the general order and happiness resulting from the present plan of nature, than of the partial evils which are not in the common course of things, and ought only to be considered as exceptions to the general rule. Would it not be both unjust and ungrateful, to observe only the storms, earthquakes, and inundations, which happen seldom, while we forget so many daily blessings, and those numerous advantages which accrue to us from the constant and regular return of the seasons ? Do we not sin against God, if we only consider the mischief which certain accidental things occasion, without reckoning the multitude of blessings we daily enjoy ?—Let us never be guilty of such criminal and thoughtless ingratitude. Let us rather reflect with humility and admiration on the works of God, and endeavour to form just and proper notions of them. For certainly there is infinite wisdom, order, and goodness, in the very things wherein we scarce discover any traces of it ; but which will open to us more and more, if we study nature with an attentive and religious turn of mind.

AUGUST XVI.

THE CARE OF ANIMALS FOR THEIR
YOUNG.

THE most remarkable instinct which God has created in the souls of beasts, is doubtless that which they show in regard to the preservation of their young. There is no animal which forsakes its young, or leaves them to chance. Their self-love, on the contrary, extends to their posterity, and that with the greatest solicitude, and in the manner most suitable to their different species, and different kinds of life. Some of those little creatures which are hatched from the eggs of fish and insects, do not require to be sat upon, because the warmth of the air in summer is sufficient, and because they are able to assist themselves as soon as they are born, provided they are in a proper place, and are within reach of food. Fish and amphibious animals cannot distinguish their young from others of the same species, and yet nature teaches them the best means to provide for the chief wants of new generations. Fish come in shoals to deposit their eggs near the shore, where the water being lower is more warmed by the sun, and where they may be hatched more easily, and afterwards find food. The amphibious animals come out of the water, to lay their eggs in the sand exposed to the heat of the sun, as if they knew that their young would find out of themselves their true element, and the place where they are designed to live and find their food. Gnats, and other insects which are born in the water, but live either in the earth or air, never fail to lay their eggs where their young ought to be born.

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The insects which fly over the earth, and which in general require no longer any food themselves, still take care to deposit their eggs in plants, fruit, flesh, and other things, which serve for food for their young. There are some which pursue other animals in order to insinuate their eggs into their skin, their hair, their mouth, or their entrails. Some animals lay their eggs in nests, which they have prepared, and where they beforehand carry all the provision their young will require. Other animals, which are helpless at their birth, are consigned to the care of their parents. How much anxiety the birds have, even before they lay their eggs ! With what assiduity and patience they brood over their eggs for several weeks, scarce giving themselves time to eat ! What care they take to warm their young, when they are hatched, and to give them proper food ! What courage they show in defending them, and securing them at the hazard of their own lives ! Is it not also a very singular instinct in the quadrupeds, to cut, with their teeth, the navel-string of their young, and do it with proper precautions, that they may not lose too much blood ? With what tenderness and attention they suckle them, and guard them from all danger ! In general, the instinct of animals, for the preservation of their young, is stronger than the desire of satisfying their own wants. They suffer hunger and thirst ; they refuse themselves sleep ; they even expose their own lives, rather than neglect their little ones. In this instinct, which God has implanted in animals, what admirable wisdom appears ! For the preservation of every species depends on the care which the parents take of their young. It is not wonderful that the viviparous animals should be fond of their young : It is their flesh

and blood. But that the oviparous should be solicitous about their eggs, is to me absolutely inexplicable. The eggs are quite different in form from the parents, and in every respect are unlike any animal. Besides this, the birds begin to build their nests before the eggs are visible; and the insects also seek places where the new generation may find subsistence, before they lay theirs.

Adorable Creator of the world, open our minds, that we may more and more acknowledge the wisdom which shines throughout all thy works!

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AUGUST XVII.

SEVERAL SORTS OF EXTRAORDINARY RAIN.

EVERY phenomenon, however natural and useful it may be, is an object of terror and fright to the ignorant and superstitious. We see a proof of it in those rains which superstition looks upon as supernatural, and which frighten so many people. Who is it that does not tremble, when he hears of *showers of blood*? Sometimes, and particularly in summer, there falls a reddish rain to which they give that name; or rather, they suppose such has fallen, when, after a common shower, the surface of the water appears red, or that some drops of that colour have fallen on the ground. The people believe it is really blood, which falls like rain. If so, it is not wonderful that it should be imputed to supernatural causes. There is nothing in it, however, but what is very natural: For the atmosphere being filled with different matter, and mixed with many foreign
bodies,

bodies, we must not be surprised that rain should partake of this mixture. It may easily happen, that coloured particles should fall with the rain. The wind may raise and scatter about the coloured meal of the flowers, and even the red excrement of certain butterflies. There are also little red insects on the surface of the water, which credulous people may take for blood. Sometimes a certain slimy humour, produced by fat reddish particles which mix in the air, falls with the rain, as it happened in 1764, in Westphalia, and other places. But this is so far from being wonderful, that it would, on the contrary, be extraordinary if these phenomena did not now and then happen. It is the same in respect to the showers of *brimstone*, which are said to fall frequently. This rain is not brimstone, properly speaking, although it is possible that the atmosphere, being full of sulphureous particles, some of them may mix with the rain. But it has been found, from many observations, that these rains are only flowers, or coloured seeds of plants, or small sand and yellowish dust, which the wind raises and brings from different countries, that mix with the rain. The supposed showers of *wheat* are formed in the same way. When heavy rain falls in places where there grows much small celandine, it uncovers their roots which are very slender. The little scallions which adhere to them, loosen and scatter about, and are supposed to be wheat fallen from the clouds, which superstitious people believe to be a sign of scarcity and famine. But from whence come all those caterpillars with which the gardens and fields are sometimes strewn after rain has fallen? Nothing more natural than this. The atmosphere, containing numberless different sorts of matter, it is very

probable that insects with their eggs should mix in it. The latter only require a place to hatch in; consequently, when they fall with the rain, they stick to the leaves, and there come to life. The possibility of this is proved by the following fact, related by respectable writers: The rains which fall in Philadelphia, during the month of August, bring with them insects, which, when they stick to men's skins, and are not immediately taken off, bite and cause violent itching. And if these little animals happen to fall on woollen-stuff, they fix in it, and multiply like moths.

We are not sensible enough of our obligation to naturalists for having, by their inquiries and remarks, removed so many superstitious prejudices. It must, however, be confessed, that the common people are still full of them, which shews that men in general are more inclined to error than to truth, and that they are not convinced, as they ought to be, of the wisdom and goodness of God's government. Let us not dishonour our reason, and God himself, by such prejudices. Let it be to us a source of consolation and joy, to be more and more convinced that every thing in nature is well ordered, and that God always proposes views infinitely wise. Let us leave to infidels and Pagans their superstition; but we who have the happiness of knowing the true God, let us glorify him by faith, and shew due honour by confiding in him; and let us labour with all our might to spread, more and more, reason, wisdom, and piety among men.

AUGUST

AUGUST XVIII.

SENSITIVE PLANTS.

WE observe certain motions in plants, which make it doubtful whether they have sensibility or not. There are vegetables, the flowers and leaves of which contract and shrink from the touch. We see others, which open and close their flowers at certain fixed hours of the day, so regularly, as to mark the time very exactly. Others take a singular form in the night, and fold themselves up. These motions in the plants are the same, whether they are in the open air, or shut up in a close room. Those which always live under water, raise their heads above it in the time of seeding. The movements of a marshy plant, discovered lately in Carolina, are still more singular: The upper side and edge of its round leaves are covered with a number of notches which are extremely irritable. When an insect chanches to creep on this upper side, the leaf folds it up close, and presses it to death; and then opens itself again. We may every day observe certain regular motions in some of the plants in our gardens. The tulips blow in fine weather, but they close again when it rains, or at sun-set. Scotch vegetables, such as pease and beans, open their husks when they grow dry, and roll up like chips. Wild oats, when put on a table, often move of themselves; particularly if they have been made warm in the hand. Do we not also observe the sun-flower and several other plants always turned towards the sun? These are undeniable facts, which any body may easily experience. From thence it was wished to draw a conclusion, that

there was some sensibility in plants ; and it is true that the above-mentioned facts give some degree of probability to that opinion. But, on the other hand, there has not been any other mark of sensibility discovered in plants ; every thing appears absolutely mechanical in them. We plant a shrub, and destroy it, without observing any analogy between the animal and it. We observe a plant shoot, grow, blossom, and turn to seed, as we observe the hand of a watch run over all the points of the dial. The most exact anatomy of a plant does not discover any organ the least resembling the seat of animal sensibility. When we oppose these observations to those from whence the sensibility of plants may be inferred, we remain in doubt, and know not how to explain the above-mentioned phenomena. Perhaps all we observe, in regard to the motions of plants, may only proceed from the construction of some of their fibres, which sometimes contract and sometimes expand. Perhaps the subtile exhalations of our bodies cause the sensitive plants to shrink when we touch them. But it may also possibly be, that all nature being linked, the first degree of sensation may subsist in certain plants ; as indeed the step is very narrow between the plant and the muscle shell-fish. Therefore sensibility may perhaps extend even to plants, at least to those nearest to the animal.

Behold, how very imperfect our knowledge is on these subjects ! All is mere conjecture. We can neither deny nor positively assert the sensibility of plants. Let us rest in uncertainty, and not endeavour to pass the bounds prescribed. Let us only give the glory due to our Creator, and be persuaded, that whatever may be the principle of these phenomena, the plan he has formed in this respect, as in all the rest, must be dictate
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by unbounded wisdom and goodness. Though these things remain obscure and problematical, we know enough to satisfy a reasonable curiosity. Let us endeavour to apply the knowledge we have, without losing time in speculations more curious than useful; and without aiming at understanding what may perhaps be reserved for those who come after us, or even for eternity itself.

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AUGUST XIX.

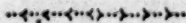
THE FEAR OF STORMS.

AT a season wherein nature presents to our eyes none but pleasing cheerful scenes, there are some people, notwithstanding, who still complain and murmur. Summer, they say, would indeed be delightful, if storms did not come to disturb and banish all joy from their souls. The fear of thunder and storms is chiefly owing to the opinion of their being effects of the wrath of Heaven, and ministers of its vengeance. For if, on the contrary, we considered how much these storms contribute to purify the air from numberless noxious vapours, and to fertilize the earth; if we would take proper precautions against the terrible effects of lightning, the storms would cease to be so dreadful to us, and would rather inspire gratitude than terror. But it may be said, however, and cannot be denied, that thunderstorms often do great mischief. How frequently has lightning struck men and animals, and consumed whole towns and villages? Yet to this we may answer, that here, as in many other cases, terror greatly magnifies the evil and the danger.

To shew how little chance there is of being struck by lightning, it is enough to know, that out of seven hundred and fifty thousand persons, who died in the space of thirty years in London, there were but two of them killed by lightning. Observe also, that during the greatest claps of thunder, most people prolong their fear without reason. Whoever has time to fear the natural consequences of lightning is already out of danger. It is only the lightning which is fatal. When we have seen and not been touched by it, and when the thunder does not come with it immediately, it is doubly foolish to turn pale or tremble at the hearing of a clap, or to stop the ears for fear of sound which is no longer dangerous. What ought to put an end sooner to our fright, or to prevent it entirely, is, that after the flash of lightning is over, we may securely wait for the clap of thunder, as it is certainly as harmless as the sound of a cannon. The thunder tells us we have escaped the danger, and at the same time informs us at what distance it is: For the greater space of time there is between the clap of thunder and the flash of lightning, the more distant is the storm.

The surest means to guard against fear of thunder, or any other alarming phenomena of nature, is to endeavour to have a good conscience. The righteous man, calm and composed, fears not the judgements of Heaven. He knows that at God's commands all nature is armed against sinners. But even when the supreme Judge strikes and terrifies the wicked, the good man knows that he is under the protection of the Most High. "He hears the thunder roar, but he trembles not. His Creator, the God whom he adores, commands the storm. He knows when it is only to terrify, and when it is to strike. He sports with the tempests and

and storms. He makes use of them to convince the infidel, who dares doubt it, of his existence, and to give terror to the wicked. It is not for the friends of God to tremble. It is their glory to love and put their trust in him, even when his thunder roars. A day will come, when raised above the stormy regions, they will traverse the clouds by the light of his lightnings." They will then find that even thunder is a blessing which God makes use of in order to purify the air; and they will bless that Great Being, who, though under an appearance the most dreadful, still vouchsafes to supply the wants of the earth. In one hand he holds the thunder, with the other he watereth the ground; and thus, by turns, he shews himself a Father and a Judge.



AUGUST XX.

SUMMER FURNISHES US WITH IMAGES
OF DEATH.

A FEW weeks ago our gardens afforded us cheerful pleasing scenes, where every thing inspired serene delight. But now the prospect becomes daily less agreeable and less varied. Most of the flowers which adorned our gardens are gone, and a few only remain, which but recal to us the charming scene we enjoyed some months ago. These revolutions in nature are instructive lessons for us. There is a time of life, in which we have all the charms of spring; we are admired and loved, and excellent fruit is expected from us. But how often is this expectation disappointed! The blossoms drop off even before they are

blown; a fit of sickness robs us of all our charms, and a premature death puts an end to all hopes. We observe the spring-flowers, which last till summer withers them, and are gone in a few hours. A striking emblem of death! There scarce passes a day in which we do not behold men surprised with sudden death, when they least expect it; one of the many means which God makes use of to draw us to our end. It is true, that from habit, we became almost indifferent to the death of so many of our fellow-citizens as are suddenly cut off. But it is not the less true, that "the days of man are as the grass of the field. In the morning it is green, and groweth up, but in the evening it is cut down, dried up, and withered."

We are now in a season when we endeavour to avoid the heat of the sun, and seek the cool shade of the forests. But are not these retreats calculated to make us reflect on the silence and darkness of the grave? It is there that we shall find rest after the fatigue and heat of the day. The mower prepares to mow his corn. The scythe cuts down the wheat on every side, and leaves desert and empty fields behind. This reminds us of our own lot. All flesh is as grass, and the whole duration of this life, with all its glory, is but as the flower of the field. Man flourishes for a little, and is then cut down, when the great Ruler of the harvest ordains it. The very bees proclaim this truth. When we reflect on the activity and industry with which they gather and prepare their honey, we learn to lay up early treasures of wisdom and virtue, which may be a comfort to us in our old age, and in the hour of death. The farmers will soon unite in gathering the fruits of the earth, to lay them up in their barns. These days of harvest
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are the most important of the whole year. But O God ! how solemn will be that great day in which the Creator himself will be the reaper ! that in which all the dead shall rise from the grave, and the supreme Judge shall say to his angels, " Gather ye together first the tares, and " bind them in bundles to burn them ; but gather " the wheat into my barn !" With what joy I look for that day of harvest ! " He that now " goeth on his way weeping, and beareth good " fruit, shall doubtless come again with joy, and " bring his sheaves with him."

These are not the only emblems of death with which nature furnishes us, but they are the strongest. The man who reflects upon them, can only consider them as the pictures of the brevity and frailty of life ; and there is no danger that such reflections as these should disturb that cheerfulness so natural to us in summer. Meditations on death are the best means of improving this happy season, and making it still more agreeable than it is. When once we look on death in its proper light, far from considering it as an enemy to pleasure, we acknowledge that the thought enobles and increases our happiness. Should we run into imprudent excesses in summer-time, if the thought of death was present to us ? Should we make an improper use of God's blessings, if we remembered that the hour will come wherein we must give an account of our administration ? Would the goods of this life corrupt our hearts, if we considered how fleeting they are ! Would the burden we bear in the heat of the day, or the miseries to which we are exposed, excite our murmurs, if we reflected that the evening would bring us comfort and rest ? Should we place our first happiness in the enjoyment of the world and
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its pleasures, if we accustomed ourselves to think, that we should one day enjoy a better world, with purer, nobler, and never-ending pleasures in it?

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AUGUST XXI.

CAUSES OF THE HEAT OF THE EARTH.

ONE of the chief causes of the heat of our globe is certainly the sun, and its position relatively to such and such parts of the earth. When the sun is in the south, the days are not so hot towards the north, as when that planet is near the northern pole. The same is observed in the southern parts of the earth, when the sun is turned towards the north. In countries where the sun is generally vertical, the cold is never so great as to freeze the rivers or lakes; on the contrary, the heat is always intense. It becomes violent when the sun is long above the horizon; and by that means darts its rays a considerable time on the same place. This is the reason, that, towards the poles, where the days are not very long, the heat is sometimes intense in certain countries. When all this is considered, we must necessarily conclude, that the sun and its position with regard to the earth, is one of the chief causes of the heat in the open air. But this is not the only cause; for, if it was, all the summers would be equally cool: the temperature of the air must also be then exactly the same in all countries situated in the same climate; which is not the case. It is observed, that, on the highest mountains, where there are spacious plains at top, and upon which there are also other hills, and other plains, it is still much colder than in low lands

lands and deep valleys. Even under the line, if from a plain where the heat is oppressive, we go up a hill 12,000 feet high, we shall find the sharpest cold. It has also been remarked in winter, that when the cold has been severe in the day-time, it has sensibly diminished towards mid-night; and the weather becomes temperate, though the rays of the sun do not then warm the atmosphere. It is therefore certain, that there may be a heat in the air which is not immediately produced by the sun. There are certain bodies, which, by friction or percussion, grow warm and take fire. The axle-trees of wheels take fire when the carriages go too fast, and are not properly greased. Other substances grow warm, and even inflame, when they meet together. If a certain quantity of water is poured on a bundle of hay or straw, it will occasion a considerable degree of heat. Bodies which corrupt or ferment, often acquire a heat perceptible by the thermometer, or merely by the feeling. Even in the air, the motion of certain substances may occasion mixtures, dissolutions, and combinations, which produce great heat. Thus, then, we may account for the production of heat in the open air. In the first place, the sun is the principal cause of it: To the heat proceeding from this planet is united that of many living creatures; that of fire produced by wood, coal, and other combustibles; that which comes out of the bowels of the earth, the bottom of the sea, and from mineral and warm springs. The heat is often much increased by the fermentations which different bodies undergo, whether in the surface of the earth, or in the higher atmosphere, and which occasion hot vapours. When, therefore, all sorts of little particles, such as float
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in the lower atmosphere, and are calculated to receive and retain heat, when they grow warm, and are carried away by the wind or rain, the heat gradually increases, and becomes more and more intense. On the contrary, it abates when any of the above-mentioned causes cease.

All these plans are worthy of the wisdom and goodness of God; they are useful to all the habitable parts of the globe; and he has granted to each climate that degree of happiness it was susceptible of. But we, in particular, who live under a temperate climate, more sensibly experience his paternal care. Heat and cold are dispensed to us in the wisest proportion; and we should be the most ungrateful of beings, were we not to acknowledge and praise his goodness towards us.

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AUGUST XXII.

VARIETY OF PLANTS.

ONE of the things most worthy of our admiration in the vegetable kingdom, is the great variety of plants. They are varied in respect to their parts, their production, their properties, and qualities. The manner in which some plants become fruitful is still very obscure. It is little known, for example, how it operates in moss, mushrooms, and fern. There are plants which shew us singular monstrosities: there are flowers which have no heads; there are some from the middle of which spring out other flowers; certain plants, called soporiferous, which turn at night differently from what they do in the day. Others turn towards the sun; others shrink and contract when we touch them. There are flowers which
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open and shut at certain regular hours. Some shoot up, blossom, bear fruit, and drop their leaves, sooner than others. All plants are originally wild; that is, they grow without culture. The Creator assigned for plants a climate adapted to their nature and purposes, and where they should arrive at the greatest perfection. But those which are exotic may be naturalized with us, and made to succeed very well, provided care is taken to procure for them the degree of heat their nature requires. What particularly charms the eye is the variety of forms in plants. Let the most perfect of them be compared to those that are least so; or let even the different sorts of the same species be compared, and we cannot but admire the astonishing variety of models from which nature draws in the vegetable world. We step with wonder from the trifle to the sensitive plant, from the mushroom to the carnation, from the acorn to the lilac, from the *nostock* to the rose-tree, from moss to the cherry-tree, from the morel to the oak, from the misletoe to the orange-tree, from the ivy to the fir. If we consider the numerous sorts of mushrooms, or the kind of plants which we call imperfect, we cannot but admire the fertility of nature in the production of those vegetables, which are so different in form from the others, that we can scarce rank them among plants. If we afterwards rise some steps up the chain of plants, we behold with pleasure the degrees of those with stalks, from the grass which grows between the stones, to that inestimable plant to which we owe our principal food. We, in the next place, observe the variety of creeping plants, from the tender bind-weed to the vine. We cannot too much admire the perfect harmony, as well as the variety
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of the works of nature. Every plant, from the hyssop which grows on walls to the cedar of Lebanon, have the same essential parts. A little herb is as complete a plant as the most beautiful rose, and the rose is not less so than the finest oak. All belong to the same source; all follow the same general laws of growth, propagation, and multiplying, and yet each species is distinct from the other. Among so many millions of plants, there is not one which has not its distinct character, properties, and particular manner of taking nourishment, of growing, and continuing its species. What inexhaustible riches in their colours, forms, and proportion! Those are happy who are capable of observing this variety, and of tasting the many different beauties of the vegetable kingdom. What pleasure may not the mind experience in such a study! After having once enjoyed it, we should find so many charms in it, that we should readily give up all others, to devote ourselves entirely to this. Our souls, enraptured with sweet contemplations, would rise to thee, O God, who art the Father of all nature. Thy power which produced every plant, thy wisdom which so well planned them, thy goodness which appears in the infinite variety of them, furnish us with continual cause to bless and glorify our Creator.

AUGUST XXIII.

REFLECTIONS ON THE ANIMAL CREATION.

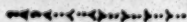
WE may consider the animal kingdom as a well governed state, in which there are a proper number of inhabitants, each in the place appointed

ed for them. All have the faculties necessary for the employments designed them. They are induced by rewards and punishments to fulfil their destination, and are protected as much as they require from their several enemies. In this animal kingdom, the little and the weak, which compose the greatest part of it, are subject to the strong and the powerful; but the whole are subject to man, as to the representative of the Deity. Animals find in every part of the earth enough to employ them, and enough to feed on. They are accordingly dispersed throughout every where; and their nature, their organs, their several constitutions, are adapted to the different situations designed them. Their employments differ greatly. All tend either to increase their species, to maintain an equal balance between the animal and the vegetable kingdom, to provide proper food, or to defend themselves from their enemies. Let us observe, that every part of their bodies is suited to their offices, and to the nature of their souls. The Creator has given them an instinct to compensate for the want of reason: An instinct varied in a thousand ways, and according to their several wants; an instinct for motion, for food, to enable them to distinguish it with certainty, to find it out, to seize upon it, and to prepare it; instinct to build nests and proper habitations, to lay in provisions, to transform themselves; instinct for the increase of their kind; instinct to defend and secure themselves, &c. In each class of animals, there are some which live on prey, and individuals which superabound in other classes. Each species has its particular enemies, which keep up the proper balance, and prevent any from multiplying too much. The fruit and the carcasses which corrupt are eaten up; the earth is not incommoded

commoded by them, nor the air infected. Thus nature preserves its beauty, freshness, and purity. The beasts of prey have a make conformable to their design. They are endowed either with peculiar strength, agility, industry, or address. But in order to prevent them from destroying a whole species, they are confined within certain limits. They do not multiply so fast as other animals; and they often destroy one another, or their young are food for other creatures. Some sleep during winter, digest slowly, and feed on fruits of the earth, for want of other food. The weaker animals are provided with defence in proportion to their situation, and the dangers to which they are exposed. Their natural arms, their swiftness, their habitations, their scales or shells, their cunning, preserve them from destruction; and by these means the proper balance is always kept, as to the number in every species of the brute creation. Animals are in some measure constrained to acquit themselves of the part assigned them, because their happiness depends upon it. They find their well-being in following the rules prescribed by nature; as, on the contrary, they could not transgress them, without drawing all sorts of evil upon themselves. The animals which give milk are the largest, and consequently the least numerous, but they fulfil very important offices. Those of birds are also various. They eat the superfluous seeds; they devour carcasses; they diminish the number of every sort of insects. Most amphibious creatures prey on other animals. The smallest animals are the most numerous, and in proportion more voracious than the larger. They make many vegetables fruitful, and serve for other useful purposes. All we behold so admirable in the animal kingdom,

kingdom, proves the existence of a Being who possesses the highest degree of wisdom and understanding. Who but he could have peopled this immense globe with so many different species of living creatures, providing for them every thing necessary? Who but he could give food to such an infinite multitude of creatures, according to their different tastes, and find them clothing, habitations, and whatever they require, to guard and defend themselves, with so much address and sagacity, so many instincts, and such industry? Who but he could have kept up the equal balance between so many different species and classes of animals? Who but he could appoint for each living creature the element suited to it; or form that amazing number of limbs, joints, bones, muscles, and nerves, joined together, and placed with so much art, harmony, and perfection, that each animal can perform its several motions, in the manner most convenient and best adapted to its way of life, and the different situations it is in?

O Lord God Almighty! it is thou only who couldst do such things, and to thee belongeth all glory, praise, and thanksgiving.



AUGUST XXIV.

DIVISION OF THE EARTH.

ALL the known countries of the earth are divided into four principal parts, Europe, Asia, Africa, and America.—Europe is the smallest, for it is but 900 German miles in length, and 1500 wide. The Europeans, however, possess countries in the three other parts of the world,
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and have subdued near one half of the earth.—None but the Europeans travel into the four quarters of the globe, to carry home the produce of all the different countries; nor are there any people so well informed as they are, or who cultivate the arts and sciences with more success. Europe is the only part of the earth which is every where cultivated and covered with towns and villages; the only place where the inhabitants keep up a constant intercourse, and profess nearly the same religion. The three other parts are inhabited by a multitude of different nations, which have no connection with one another; who are scarce acquainted; and who differ greatly in their manners, way of living, and in their religion.—Asia is the largest known continent: it is between 1500 and 2000 German leagues long, and 1200 wide. As the countries that are in the interior of this part of the world do not enjoy the cool sea breezes, as they are not watered by many rivers, as they have vast plains and barren mountains, the heat and cold are in the extreme. The earth is unfruitful, and consequently never well cultivated. Even at this time, those countries are only inhabited by people, who, in the morning, pull down their towns and villages to carry them some miles farther, and build them up again at night in an hour. It seems as if Nature had made this wandering and unsettled life necessary; and intended that the establishment, laws, and government of these people should be less durable, and more subject to change, than elsewhere. The other people of Asia often suffer greatly from the restless and unquiet character of these wandering nations. The northern parts, which are full of lakes, marshes, and forests, have never been regularly inhabited; but the southern, eastern, and western

western countries are the finest in the world, and are wonderfully fertile, producing the necessaries of life in great abundance.—Next to Asia, Africa is the largest part of our hemisphere, since it is a thousand leagues square. As it is under the torrid zone, there are immense sandy deserts, mountains of prodigious height, forests burnt up, and monsters of every sort there. The oppressive heat enervates and weakens every faculty of the soul there. The innermost part of Africa is still almost unknown; though that quarter of the world is the nearest to Europe.—America was not discovered by the Europeans till within some centuries. It is divided into two continents, separated only by a very narrow isthmus, or neck of land, and surrounded by a great many islands. The cold climate of the northern part, its few productions, and its distance from inhabited countries, prevent its being entirely known as yet; but we have every reason to believe, that the natives are uncivilized. The earth there is still covered with forests and marshes; and hitherto the Europeans have only cultivated the eastern coasts. In the south of America there were formerly some great nations. The remainder was inhabited by savages. It is the country for serpents, reptiles, and insects, which are much larger there than in Europe. It may be said, on the whole, that America is the country of greatest extent, but with the fewest inhabitants.

If we reckon the number of leagues these four parts of the globe occupy, their size will appear very considerable; and yet all the known countries make but a fourth part of this earth. And what is our world in comparison with those immense bodies which God has placed in the firmament. It is lost in the numberless multitude of celestial globes,

globes, like grains of sand in a great mountain. However, to us, in whose eyes a cubit appears considerable, the terrestrial globe is still a great scene of the wonders of God. And as we know but little of the worlds above us, let us at least endeavour to know that which we inhabit, and to turn that knowledge to the glory of God.

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AUGUST XXV.

THE NATURE AND PROPERTIES OF LIGHT.

WE every moment experience the use of light, but we cannot with certainty decide the nature of it. All that has been said on the subject is conjecture. Perhaps, light is a fluid substance by which we are surrounded, and which only may require, in order to be perceptible, the being put in motion by the sun or some other fiery body: Or perhaps, it is the fire itself, which, by the infinitely subtile particles issuing from it, gently strikes our eyes at a certain distance. The first of these hypotheses has been adopted by the most famous naturalists. It is certain, at least, that there is a great difference between fire and light. The latter is beyond all comparison more subtile than fire. It penetrates glass, and other transparent bodies, in a moment; whereas fire does it very slowly. The pores of glass, consequently, must be large enough for the light to pass through them easily; while the fire meets more resistance, because it is less subtile. It is observable, that fire moves more slow than light. Let burning coals be put into a room, and the heat will spread
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but slowly, and the air will only grow warm by degrees; but as soon as a lighted candle is brought into a room, it is suddenly lighted by it, and seen wherever its rays can reach. From these and some other facts, we conclude that fire and light, are different substances, though we generally see them both together, and though one can occasion the other. But we may very possibly draw some false consequences from hence. The properties and effects of light are not less incomprehensible than its nature. If its swiftness was not greater than that of sound, it would take up seventeen years to come from the sun to us, but it only requires from seven to eight minutes to do so. In that short time, a ray of the sun darts over many millions of leagues, and in a second, goes over twenty thousand. Now, as sound reaches only 10,700 feet in a second, a globule of light must be 590,000 times more subtile than a particle of air, although the latter is not visible to the naked eye, nor even with the best magnifying glasses. Besides, the observations of astronomers inform us that the rays of a fixed star, in order to reach us, must go farther than a cannon-ball, shot with the greatest force, could go in the space of 104,000 millions of years. The extent or expansion of light is not less inconceivable. The space in which it spreads has no limits but the universe itself, the immensity of which exceeds the capacity of the human understanding. This almost boundless extent is the cause of the most distant objects (for example the heavenly bodies) being discernible with the help of telescopes, or even by the naked eye. And if we had optical instruments which could extend our sight as far as the light can spread itself, we should be enabled to see bodies in the most distant extremities of the

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universe. It is certain, that our understandings are too limited to investigate the nature and properties of light. But, we might explain many things, if we give proper attention to them.— Why, for example, does light spread on all sides with such prodigious swiftness, if it is not in order that an infinite number of objects should be seen at the same time by a vast number of people? Do not the rays dart so rapidly, for the purpose of discovering to us quickly, even the most distant objects? If the increase of rays acted more slowly, there would result from thence great inconvenience. The light would not be near so strong or bright, the rays would not penetrate so well, and the darkness would be dissipated but slowly and with difficulty. Why are the particles of light so wonderfully subtle, if it were not in order to paint even the most minute objects to the eye? Why is there not more density in these particles? Why are they not so thin, if it is not to prevent them from dazzling us with their brightness, or hurting us by their heat? Why are the rays refracted in so many ways, if it is not to make objects more distinguishable to us?

Thus the Creator ever has in view the benefit and happiness of his creatures. What gratitude do we not owe to the Father of light, for such beneficent plans! If he had not created light, how could we enjoy life! How many sources of pleasure should we be deprived of! And how narrow would the limits be of our knowledge and our occupations?

AUGUST XXVI.

THE FORMATION OF BIRDS.

BIRDS may undoubtedly be ranked among the most beautiful creatures in the world. The form of their bodies, even in its least parts, is so regular and perfect, that it is enough to convince us of the wisdom of the Creator. They, as well as those animals who give milk, have real bones ; but they are very differently clothed. Their bodies are covered with feathers fastened into the skins, laid one over another in regular order, and furnished with a soft and warm down. The large feathers are covered again, over and under, with smaller feathers. Each feather has a quill with beards. The quill is hollow at bottom, and from thence the feather receives its nourishment. Towards the top it is full of a sort of marrow. The beards are a range of little thin flat flakes, pressed close to one another on both sides. Instead of the fore legs of the quadruped, the birds have two wings. They are composed of eleven bones, into which are set the feathers intended for flight. These feathers turned back, form a sort of arch, strengthened still more by two rows of smaller feathers, which cover over the root of the large ones. The mechanism of the wings is truly admirable : they do not strike behind like the fins of fish, but they act perpendicularly against the air which is under them, and which assists the flight of the bird greatly. The wings are a little hollow, in order to collect more air ; and yet they are so close, that no air can penetrate through them. The body is suspended between the two wings in a perfect balance, and in the manner best adapted for the motions it is to perform. The heads of birds are

small, that the weight may not retard the vibration of the wings ; and to be more proper to cut the air, and make their way through that element. The principal use of the tail is not to supply the place of a rudder ; but it particularly serves to preserve the balance in flying, and to assist the bird in rising into the air, and descending again. The legs, never more than two, are generally so placed, as to keep the body in the centre of gravity. Some birds have them more behind, and can only make use of them in swimming. The legs are composed of the thigh, of the leg, properly speaking, and the claws. The thighs are covered with muscles, and almost always with feathers. As for the legs, they are thin, and generally without feathers. Most birds have four toes, three of which are before, and one behind. At the end of the toes they have nails, which they make use of either to perch, or to seize their prey, and to take up their food. Some birds feed on animals, others on plants and seeds of plants. Those which live on seeds, steep and soften them in their crop ; from whence there can pass but little food at a time into the stomach, because in this sort of bird it is but small. Their stomachs are composed of very strong muscles, by means of which, the food is so much the better bruised and ground, as those birds generally swallow sand, and little hard uneven stones, to assist digestion. Birds of prey have much weaker stomachs, but they also have recourse to stones to facilitate its functions. The bodies of birds are formed, throughout the whole, with such art and harmony, as to be perfectly adapted to their way of life, and their different wants. The stork and the heron, which must seek their food chiefly in marshes, have long bills ;

bills ; and are raised high, that they may run into the water without wetting themselves, and yet go very far in to reach their prey. The vulture and eagle, who live only by rapine, are provided with great wings, strong claws, and sharp bills ; which are necessary to keep them from starving. The swallow's bill is small and pointed ; the mouth large and cut up to the eyes ; on one hand, not to miss the insects they meet flying ; and, on the other, that they may pierce through them more easily. The swan has in its windpipe, a particular reservoir, from whence it draws air enough to breathe when it puts its head and neck under water to seek food. Several little birds, which flutter and hop among the thick bushes, have a pellicle on their eyes ; to guard them. In a word, the formation of each bird is wonderfully adapted to its own way of life. Each species is perfect in its kind ; and no limb is useless, superfluous, or deformed. The wisdom observable in this, will appear still more extraordinary, if we consider that every part of a bird, at the same time as it is suited to their uses, also combines to adorn and give them the most beautiful form. What wonderful difference of construction, proportion, colour, and voice, do we not observe between the raven and the swallow, the partridge and the vulture, the wren and the ostrich, the owl and the peacock, the crow and the nightingale ? All these birds are beautiful and regular in their kind ; but each has its peculiar beauty and regularity.

Thus may the sight of birds become useful and edifying to us, if we accustom ourselves to trace them up to God that created them. Happy for us, if we make this use of his creatures. What an agreeable employment, what

pure and celestial pleasures may not such reflections afford !

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AUGUST XXVII.

REFLECTIONS ON THE SKY.

WE need only cast our eyes on the sky, to be struck with admiration at the sight of this magnificent work of the Creator. With what lustre shines this rich canopy over our heads, particularly in the night, when millions of stars appear, and when the moon sheds its mild light from far ! Who can raise their eyes, and contemplate this beautiful sight, without astonishment, without the sweetest emotion ! But we discover still greater wonders, when, with the mind's eye, we traverse that immense space, and make it the subject of reflection. Where are the bounds to this space ? Where the beginning or the end of it ? Globes without number, and of a prodigious size, rise there one above another, and the human mind that would attempt to follow them in their rapid courses, soon would discover its weakness. A pure ethereal air, infinitely subtle, fills that space, supports those prodigious bodies, and traces for them the circles in which they continually run. There are no props or pillars to support this immense vault. It is not suspended or fastened to any thing, and yet it has supported itself for thousands of years, and will continue to do so for ever. What a number, and how great the size, of those celestial bodies with which the sky is filled ! The size of the sun, and of many of the planets moving round it,

it, much exceeds that of our earth. And who knows how many there are of the other stars which may yield to them in nothing, and may even be still more considerable! Their prodigious distance makes them only appear to us as little lights sparkling in the sky. But, in reality, they are so many suns, the immense circumference of which cannot be measured. With the naked eye we behold innumerable celestial bodies, when the absence of the sun in the night permits us to see them shine. How many more do we discover with telescopes! It is also probable, that there are many out of the reach of our best glasses. We may venture to assert, that many millions of suns and worlds roll in the firmament, and that our solar system is but the smallest part of that great multitude ranged above us in such beautiful order. But the heavens present still greater wonders to an attentive mind. Those bodies are in a perpetual motion, which is subject to invariable laws. They all turn round their own axis, and most of them also run immense courses round other globes. One particular path is appointed for each of them, from whence they never deviate. They run their course with a swiftness which passes all imagination. They have a force by which they fly from the centre, and yet an equal force retains them within their orbit. Though so many millions of bodies move in the same space, they never hit against, or incommode one another. Those stars which appear to us confusedly spread in the firmament are, on the contrary, placed in the greatest order and the most perfect harmony. They have risen and set regularly in the same manner these thousands of years, and astronomers can foretell exactly their position and course.

What new subjects of admiration we should have, if we were better acquainted with those innumerable globes ! But we know little, except the system of which our earth makes a part, and of which the sun is in a manner the head or chief.

Who can look up and contemplate the sky, without being struck with astonishment at the thought of the great Being who framed such magnificent works ? Let our admiration lead us to humble ourselves lowly before him, to adore and glorify him. And when we reflect how poor and imperfect our homage is, let us comfort ourselves with the thought of that happy revolution we shall one day experience, when the nearer contemplation of the wonders we now see but faintly at a distance will make our hearts overflow with gratitude and joy.



AUGUST XXVIII.

MORAL REFLECTIONS ON SEEING A FIELD OF CORN.

THIS field was lately exposed to great danger ; impetuous winds whistled round it, and the storms often threatened to beat down and destroy the wheat. However, Providence has preserved it hitherto. It is thus that the storms of affliction often threaten to overwhelm us. But this very tempest is necessary : It purifies and roots out the tares of vice. In the midst of trouble and sorrow, our knowledge, faith, and humility, increase and strengthen. It is true, that, like the weak ear of corn, we sometimes bend and are bowed

bowed down to the ground ; but the merciful hand of our Father supports and raises us up again. Towards harvest time, the corn ripens fast. The dew, the heat of the sun, and the rain, all combine to hasten it. O ! may we, from day to day, grow ripe for heaven. May all the events of our lives lead to that salutary end. Whatever be our situation here ; whether the sun shines upon us, or is wrapt up in clouds ; whether our days be gloomy or serene ; no matter, provided all concur to increase our piety, and dispose us better for eternity. It is very remarkable, that the ears of corn, loaded with grain, differ considerably in height from those that are poor and thin. The latter are upright, rise high, and overlook the whole field ; whereas the others bend under their own weight. Behold the emblem of two sorts of Christians ! the vain and presumptuous, who have but little religion, set themselves above others, and look with contempt on the truly righteous. A foolish presumption blinds them, and makes them despise the means of salvation. Those, on the contrary, who are rich in virtue and good works, humbly bend down like the well filled ears of corn. How many tares and weeds are mixed with the corn ! Such is the situation of a Christian in this world. There is always a mixture in him of good and bad qualities, and his corrupted nature, like the tares, often interrupts the progress of virtue. A field of corn is not only the image of one individual, but also of the church in general. The profane and the wicked often, by their bad example, sow tares in a field where there ought to be none but good seed. The great Lord of the field permits the tares to remain some time. He tries patience and forbearance : and it will not be

be till the time of harvest, in the great day of retribution, that he will give free course to his justice. Behold with what eagerness the country people run to gather the fruits of the earth ! The scythe cuts all before them. Thus death sweeps all away, the high and the low, the saint and the sinner. But what are those cries in the fields ? They are shouts of joy and gladness at the sight of a plentiful harvest. Let them be also cries of praise and thanksgiving for the goodness of God, from whom proceeds every blessing. But how joyful shall we be in the great day of harvest ! with what ineffable sentiments will our hearts overflow, when we shall meet in the blessed society of angels ! Then shall we gratefully recollect our past labour and pain, the dangers and storms we had experienced, and we shall raise our voices with one accord to bless the beneficent Father who watched over us. May this sweet hope support us in the time of trouble. Let it comfort us in our sorrow, and make us wait with patience for the day of harvest.

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AUGUST XXIX.

SHELL-FISH.

THE shell-fish, or testaceous animals, are numerous. They live in houses of a substance more or less chalky, which may be considered as their bones. Their shells are either single, that is to say, in one piece ; bivalves or multivalves, that is to say, composed of two or more pieces. The testaceous animals form two large families ; the muscle, the shell of which is in several pieces, and the snail, whose shell is in one piece only, and

and generally spiral. The construction of the former is much more simple than that of the latter. The muscles have neither head, nor horns, nor jaws; there can only be distinguished in them a wind-pipe, a mouth, and sometimes a sort of claw. Most snails, on the contrary, have a head, horns, eyes, a mouth, and a claw. There is a great difference among the shell-fish; Some are oviparous, others viviparous. The testaceous are born with their shells upon them; but in proportion as the animal grows, its house, the inner partition of which is lined with a very fine membrane, grows also; not only in thickness, by layers or leaves one over another, but in circumference, as the circumvolution, or spires, multiply more and more. The shells are formed by means of a slimy liquor, which is produced by the perspiration of the animal, and which gradually thickens and grows hard. But whether the shells grow by an exterior juxtaposition, or by a common inward nourishment, is not certainly determined. It is more probable that it is by the former means. Most shell-fish live in water, and particularly in the sea; sometimes near the shore, and sometimes in the main ocean. Some are carnivorous; others feed on plants. Some keep at the bottom of the sea, or adhere to rocks, and remain motionless. Oysters, and other animals with hard shells, fasten themselves to different bodies, and stick to them by means of a sort of glue, or chalky liquor; and are often heaped and fastened one upon another. This adhesion is voluntary in some shell-fish, who cling to any thing, according as circumstances oblige them to it; but it is involuntary in others, which always remain motionless on the rocks to which they are fastened. The knowledge we have of
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these animals is still very imperfect. As they mostly live in the bottom of the water, it is very difficult to make exact observations on their formation, their feeding, their motions, &c. There are only three or four different classes of shell-fish yet known; but it is very probable that an hundred more would be discovered, if it was possible to search into the bottom of the sea, or into rivers. Hitherto we have scarce attended to any thing but the beautiful forms and colours of the shells, while the true construction and way of life of the animals that live in them are still little known to us, nor do we know scarce the purpose of their existence. But even these, as far as we know of them, are subjects sufficient to lead us to admire the infinite greatness of God. We every where find creatures, which, each in their way, bear the impression of the majesty of the Lord. To feel this truth, we need only look into the cabinets of shells that are collected, and there observe the prodigious variety, in their size, their form, the richness and beauty of their colours. Here the hand of God visibly shews itself; and every thing convinces us, that all his designs are worthy of his wisdom.

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AUGUST XXX.

ON THE GOVERNMENT OF GOD.

A GOD who from his supreme height could be an indifferent spectator of all the revolutions which happen in this world, would not merit our homage. Happily for us, the government of the God whom we adore takes in all his creatures.

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We every where find the centre of his empire, but we no where see its bounds. All his works are continually before him. At one glance, he beholds the past, the present, and the future, and comprehends all the combinations and relations between them. The least events, the smallest circumstances, nothing escapes him ; every thing together enters into the plan he has laid down to compass the infinitely wise and gracious purposes he formed. And these purposes unite and combine, to procure for his creatures the highest possible degree of happiness. God takes pleasure in his works ; he sees them with one glance, and rules them by a single act of his will. His laws are dictated by wisdom, and his commands are a source of joy and happiness. God, by his providence, preserves every species of creatures formed from the beginning of the world. Animals die, and others come in their place. Generations of them pass away, and others succeed. The Ruler of the world makes use of inanimate creatures to preserve the living, and to make them happy. Lastly, He makes them all subject to man, who alone is capable here of knowing his works, and of adoring him. This God, who is goodness itself, expects that his rational creatures should be good also. By the proofs he continually gives of his love of righteousness and his horror of sin, he speaks to the heart, and constantly persuades us to walk in the paths he has prescribed. He directs our actions according to his views. He makes our understandings fail when they are contrary to his merciful designs ; and he gives us means of quitting the paths of iniquity. What wise measures he took in order to lead the children of Israel to the salutary ends that he proposed ! In vain did the idolatrous nations more than
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once conspire their destruction ; they were still preserved by the protection of their God. He neglected nothing to maintain amongst them that pure and holy religion, which distinguished them from the blind and superstitious nations around them. But our God inhabits light inaccessible. There is a depth of wisdom in his government, which none but he can fathom. Our understandings are too weak to see through the whole of his plans, or to form a just idea of his views, before the event has discovered them. Our knowledge is too limited to penetrate into the counsels of an infinitely wise Being, or to discover before-hand the motives of his dispensations. The wicked man often sits among princes, whilst the righteous are humbled in the dust. The wicked triumph, and the good man is oppressed. Every thing smiles on the bad, whilst the friend of God meets nothing but disgrace and disappointment : And yet there is a Providence. Yes : Notwithstanding all these apparent disorders, the Lord is ever the tender Father of all his creatures. He is their infinitely wise God, their just and equitable Ruler. All his dispensations are adorable, however impenetrable they may appear to us. His counsels are wonderful. His plans surpass our understanding, but they are always formed and executed with sovereign wisdom. All that happens in this world, and at which we often wonder, tends to excellent purposes. The load of affliction and misery, under which some groan, may possibly have the happiest effect on their future state. The apparent evil may perhaps be a necessary medicine for the soul, and on this salutary correction may possibly depend their faith, the purity of their hearts, and their eternal felicity. Whoever is discontented with his lot, let him consider all these things, and
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he will cease to murmur. Why, O man ! dost thou undertake to fathom the plans on which God governs the world ? Thy understanding is limited, and yet thou pretendest to discover the views which the Supreme Being proposes to himself. Thou canst not take in the whole chain of things which pass before thee. Thou knowest not what has preceded, or what is to follow ; and yet thou hast the presumption to judge of causes and effects. Providence is just in all his plans, and all his dispensations. It is true, that thou seest not always the motives of his conduct, but to be able to judge of them rightly, thou must be what God is.

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AUGUST XXXI.

HARVEST HYMN.

OUR fields crowned with blossoms and with corn are a hymn to the Lord. The joy that sparkles in the eyes of the farmer is a hymn to the God of nature. It is he who makes the earth produce bread, and he that loads us with blessings. Let us gather together and sing praises to the Lord. Let his praise be evermore the subject of our song. Let us hearken unto the words he says unto us, from the bosom of our fertile fields. "The year will crown thee with blessings, O world ! thy happiness is my work, and "I have called the spring ; the crops, and the "harvest are the works of my power. The rich "meadows, and the hills covered with corn, are "mine." Yes, Lord, we behold thy greatness, and we feel the value of thy favours. It is
through

through thee that we exist: Life and food are the gifts of thy hands. Blessed be thou, O field, which producest food for man! Prosper, thou beautiful meadow! be covered, ye forests, with a thick shade! O Nature, be thou ever beneficent towards us! Then, from morn to night, will the Lord be the object of our praise. Free from cares, we will rejoice in his blessings; and our children will repeat after us, The God of heaven is our Father, the Lord, the Almighty Lord is God.

END OF VOLUME SECOND.



